1. Identification of the substance/mixture and of the company/undertaking
   
   Product identifier:
   
   Product name: Tetrahydrofuran
   
   Details of the supplier of the safety data sheet
   
   Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.
   
   Address: 3-1, Honmachibashi, Chuo-ku, Osaka 540-0029, JAPAN
   
   Division: Safety Management Dept. of Chemicals
   
   Telephone number: +81-6-6946-8061
   
   FAX: +81-6-6946-1607
   
   e-mail address: kagakuhinanzenkanri@kishida.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
   
   Serious eye damage/eye irritation: Category 2A
   
   Carcinogenicity: Category 2
   
   Reproductive toxicity: Category 2
   
   Specific target organ toxicity – single exposure: Category 1(CNS)
   
   Specific target organ toxicity – single exposure: Respiratory tract irritation Category 3
   
   Specific target organ toxicity – single exposure: Narcosis Category 3
   
   Specific target organ toxicity – repeated exposure: Category 1(CNS; respiratory apparatus; liver)

   Label elements

   Signal word: Danger

   HAZARD STATEMENT
   
   Highly flammable liquid and vapor
   
   Harmful if swallowed
   
   Harmful if inhaled
   
   Causes serious eye irritation
   
   Suspected of causing cancer
   
   Suspected of damaging fertility or the unborn child
   
   Causes damage to organs after single exposure
   
   May cause respiratory irritation
   
   May cause drowsiness or dizziness
   
   Causes damage to organs through prolonged or repeated exposure

   PRECAUTIONARY STATEMENT
   
   Prevention
   
   Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
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 and face protection.
Wear eye protection/face protection.
Do not eat, drink or smoke when using this product.

Response
In case of fire: Use appropriate media other than water for extinction.
Get medical advice/attention if you feel unwell.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
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.
Rinse mouth.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

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

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

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(min)
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.
Impurities and stabilizing additives
Stabilizer:BHT about 250ppm

4. First-aid measures
Descriptions of first-aid measures
General measures
Get medical attention/advice if you feel unwell.

IF INHALED
Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.

IF ON SKIN (or hair)
Take off immediately all contaminated clothing. Rinse skin with water/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.
Call a POISON CENTER or doctor/physician if you feel unwell.

5. Fire-fighting measures
Extinguishing media
Suitable extinguishing media
Use appropriate extinguishing media suitable for surrounding facilities.
Specific hazards arising from the substance or mixture
Containers may explode when heated.
Fire may produce irritating, corrosive and/or toxic gases.
Advice for firefighters
Specific fire-fighting measures
Evacuate non-essential personnel to safe area.
Special protective equipment and precautions for fire-fighters
Wear fire/flame resistant/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
Ventilate area after material pick up is complete.
Wear proper protective equipment.
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.

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/sparks/open flames/hot surfaces. − No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Exhaust/ventilator
Exhaust/ventilator should be available.
Safety treatments
Avoid contact with skin.
Avoid contact with eyes.
Safety Measures/Incompatibility
Use only outdoors or in a well-ventilated area.
Wear protective gloves, protective clothing or face protection.
Wear eye protection/face protection.
When using do not eat, drink or smoke.

Conditions for safe storage, including any incompatibilities
Recommendation for storage
Keep container tightly closed.
Store in a cool, dry place. Do not store in direct sunlight.

8. Exposure controls/personal protection
Control parameters
Adopted value
(Tetrahydrofuran)
ACGIH(2002) TWA: 50ppm;
STEL: 100ppm (URT irr; CNS impair; kidney dam)

Notation
(Tetrahydrofuran)
Skin

OSHA–PEL
Tetrahydrofuran TWA: 200ppm, 590mg/m3

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.

Eye protection
Wear eye/face protection.

Safety and Health measures
Wash … thoroughly after handling.
Do not eat, drink or smoke when using this product.

9. Physical and Chemical Properties
Information on basic physical and chemical properties
Physical properties
Appearance: Liquid
Color: Colorless
Odor: Characteristic odor
pH data N.A.

Phase change temperature
Initial Boiling Point/Boiling point: 66°C
Boiling range data N.A.
Melting point/Freezing point: −108.5°C
Decomposition temperature data N.A.
Flash point: (Tetrahydrofuran)(C.C.) −14.5°C
Auto-ignition temperature: 321°C
Explosive properties: Flammability or explosive limit
Lower limit: 2.0 vol %
Upper limit: 11.8 vol %
Vapor pressure: 19.3 kPa (20 °C)
Relative Vapor Density (Air=1): 2.5
Relative density of the Vapor/air-mixture at 20°C (Air = 1): 1.28
Specific gravity/Density: 0.89
Solubility
   Solubility in water: Miscible
n-Octanol /water partition coefficient data N.A.

10. Stability and Reactivity
Reactivity
   N.A.
Chemical stability
   Stable under normal storage/handling conditions.
Possibility of hazardous reactions
   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
   Strong bases, Strong oxidizing agents, Metal halides
Hazardous decomposition products
   Carbon oxides, Explosive peroxides

11. Toxicological Information
Information on toxicological effects
Acute toxicity
   Acute toxicity (Oral)
      [GHS Cat. Japan, base data]
      (Tetrahydrofuran)
      rat LD50=1650mg/kg (MOE risk assessment vol.5, 2006)
Acute toxicity (Inhalation)
   [GHS Cat. Japan, base data]
   (Tetrahydrofuran)
   vapor: rat LC50=18187ppm/4hr (MOE risk assessment vol.5, 2006)
Irritant properties
   Serious eye damage /irritation
   [GHS Cat. Japan, base data]
   (Tetrahydrofuran)
   rabbit/human moderate, severe irritation (HSDB, 2014 et al)
No Allergenic and sensitizing effects data available
No Mutagenic effects data available
Carcinogenicity
   [GHS Cat. Japan, base data]
   (Tetrahydrofuran)
   cat.2; ACGIH A3 (ACGIH 7th, 2001 et al.)
   (Tetrahydrofuran)
   IARC–Gr.2B : Possibly carcinogenic to humans
   (Tetrahydrofuran)
12. Ecological Information

Ecotoxicity

Aquatic toxicity

Aquatic acute toxicity component(s) data
[Japanese published data]
(Tetrahydrofuran)
Fish (fat head minnow) LC50=2160mg/L/96hr (ECETOC TR91, 2003)

Aquatic chronic toxicity component(s) data
[Japanese published data]
(Tetrahydrofuran)
Fish (fat head minnow) NOEC=216mg/L/35-38days (MOE Japan, 2009)

Water solubility
(Tetrahydrofuran)
Miscible (ICSC, 1997)

Persistence and degradability
(Tetrahydrofuran)
Degradate rapidly (BOD degradation: 100% (Registered chemicals data check & review, 1975))

Bioaccumulative potential data available
No Mobility in soil data available
Ozone depleting chemical data not available
13. Disposal considerations
   Waste treatment methods
   Dispose of contents/container in accordance with local/national regulation.

14. Transport Information
   UN number: 2056
   UN proper shipping name: TETRAHYDROFURAN
   Transport hazard class(es): 3
   Packing group: II
   ERG GUIDE NO.: 127
   Environmental hazards
   MARPOL Annex V – Substances Harmful to Marine Environment
   Specific target organ toxicity – repeated exposure: cat.1 Tetrahydrofuran
   Transport in bulk according to Annex II of MARPOL 73/78 and IBC Code
   Noxious Liquid ; Cat. Z Tetrahydrofuran

15. Regulatory Information
   Safety, health and environmental regulations/legislation specific for the substance or mixture
   US major regulations
   TSCA Tetrahydrofuran
   Other regulatory information
   Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. Other information
   GHS classification and labelling
   Flam. Liq. 2: H225 Highly flammable liquid and vapor
   Acute Tox. 4: H302 Harmful if swallowed
   Acute Tox. 4: H332 Harmful if inhaled
   Eye Irrit. 2A: H319 Causes serious eye irritation
   Carc. 2: H351 Suspected of causing cancer
   Repr. 2: H361 Suspected of damaging fertility or the unborn child
   STOT SE 1: H370 Causes damage to organs after single exposure
   STOT SE 3: H335 May cause respiratory irritation
   STOT SE 3: H336 May cause drowsiness or dizziness
   STOT RE 1: H372 Causes damage to organs through prolonged or repeated exposure
   Reference Book
   Globally Harmonized System of classification and labelling of chemicals, (5th ed., 2013), UN
   Recommendations on the TRANSPORT OF DANGEROUS GOODS 19th ed., 2015 UN
   Classification, labelling and packaging of substances and mixtures (table3–1 ECNO6182012)
   2016 EMERGENCY RESPONSE GUIDEBOOK (US DOT)
   2018 TLVs and BEIs. (ACGIH)
   http://monographs.iarc.fr/ENG/Classification/index.php
   Supplier’s data/information
   General Disclaimer
   This information contained in this data sheet represents the best information currently
available to us. However, no warranty is made with respect to its completeness and we assume no liability resulting from its use. It are advised to make their own tests to determinate the safety and suitability of each such product or combination for their own purposes.

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 2017).