



## Safety Data Sheet

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

Product identifier:

Product name: Triethyl orthoformate

SDS No. : 8024E-1

Details of the supplier of the safety data sheet

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

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

HEALTH HAZARDS

Acute toxicity (Inhalation): Category 4

Carcinogenicity: Category 1A

Reproductive toxicity: Category 1A

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

Label elements



Signal word: Danger

HAZARD STATEMENT

Flammable liquid and vapor

Harmful if inhaled

May cause cancer

May damage fertility or the unborn child

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.

Avoid breathing dust/fume/gas/mist/vapors/spray.

Use only outdoors or in a well-ventilated area.

Wear protective gloves and face protection.

Response

In case of fire: Use appropriate media other than water for extinction.

IF exposed or concerned: Get medical advice/attention.

Call a POISON CENTER or doctor/physician 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.

#### Storage

Store in a well-ventilated place. Keep cool.

#### Disposal

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

#### Specific Physical and Chemical hazards

Flammable liquid. Vapor/air mixture may explode.

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### 3. Composition/information on ingredients

#### Mixture/Substance selection:

##### Substance

Ingredient name:Triethyl orthoformate

Content (%):97(min)

Chemical formula:HC(OC<sub>2</sub>H<sub>5</sub>)<sub>3</sub>

Chemicals No, Japan:2-683

CAS No.:122-51-0

MW:148.20

ECNO:204-550-4

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

#### Impurities

•Ethanol ≤0.3% (CAS No.64-17-5)

•Toluene <0.3% (CAS No.108-88-3)

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### 4. First-aid measures

#### Descriptions of first-aid measures

##### General measures

IF exposed or concerned: Get medical attention/advice.

Call a POISON CENTER or doctor/physician 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.

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### 5. Fire-fighting measures

#### Extinguishing media

##### Suitable extinguishing media

In case of fire, use foam, dry powder, CO<sub>2</sub> to extinguish.

##### Unsuitable extinguishing media

Indoor firefighting equipment or outdoor firefighting equipment

Sprinkler equipment



Dry-powder firefighting equipment – except for phosphate etc.,hydrogen carbonate etc.  
Straight stream water extinguisher  
Water mist extinguisher  
Reinforcing liquid jet extinguisher  
Dry-powder extinguisher – except for phosphate etc.,hydrogen carbonate etc.  
Bucket of water or tank of water

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.

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6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Ventilate area until material pick up is complete.

Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses or low areas.

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.

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7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

Avoid breathing 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

Use only outdoors or in a well-ventilated area.

Wear protective gloves, protective clothing or face protection.

When using do not eat, drink or smoke.

Any incompatibilities

See "10.Stability and Reactivity"

**Storage**

## Conditions for safe storage

Keep container tightly closed.

Store in a cool, dry place. Do not store in direct sunlight.

## Container and packaging materials for safe handling

Glass

Iron

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**8. Exposure controls/personal protection**

## Control parameters

## Adopted value

(Toluene)

ACGIH(2006) TWA: 20ppm (Visual impair; female repro; pregnancy loss)

(Ethanol)

ACGIH(2008) STEL: 1000ppm (URT irr)

## OSHA-PEL

(Toluene)

TWA: 200ppm; STEL: C 300ppm

Acceptable maximum peak: 500ppm; Maximum Duration: 10min

(Ethanol)

TWA: 1000ppm, 1900mg/m<sup>3</sup>

## 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.

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**9. Physical and Chemical Properties**

## Information on basic physical and chemical properties

Physical state: Liquid

Color: Colorless

Odor: Characteristic odor

pH data is not available.

Boiling point or initial boiling point data is not available.

Boiling range data is not available.

Melting point/Freezing point data is not available.

Decomposition temperature data is not available.

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

Flash point: (Triethyl orthoformate)36°C

Auto-ignition temperature data is not available.

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

Vapor pressure data is not available.

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

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

Kinematic viscosity data is not available.

**Solubility:**

Solubility in water: Slightly soluble

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

No Particle characteristics data is not available.

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**10. Stability and Reactivity****Reactivity**

Not available.

**Chemical stability**

Stable under normal storage/handling conditions.

**Possibility of hazardous reactions**

Not available.

**Conditions to avoid**

Contact with fire source.

**Incompatible materials**

Not available.

**Hazardous decomposition products**

Carbon oxides

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**11. Toxicological Information****Information on toxicological effects****Acute toxicity****Acute toxicity (Inhalation)**

[GHS Cat. Japan, base data]

(Toluene)

vapor: rat LC50=3319-8800ppm/4hr (EU-RAR, 2003) et al.

(Triethyl orthoformate)

vapor: rat LC50=5656ppm/4hr (IUCLID, 2000)

**Irritant properties****Skin corrosion/irritation**

[GHS Cat. Japan, base data]

(Toluene)

rabbit moderate irritation (EU-RAR, 2003)

**Serious eye damage/irritation**

[GHS Cat. Japan, base data]

(Toluene)

rabbit slight eyes irritation (EU-RAR, 2003)

(Ethanol)

rabbit recover within 7 days (ECETOC TR No.48(2), 1998 et al)

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

**Carcinogenicity**

[GHS Cat. Japan, base data]

(Ethanol)

cat.1A; (ACGIH 7th, 2012; IARC, 2010)

(Toluene)

IARC-Gr.3 : Not Classifiable as a Human Carcinogen

(Ethanol)

IARC-Gr.1 : Carcinogenic to humans

(Ethanol)

ACGIH-A3(2008) : Confirmed Animal Carcinogen with Unknown Relevance to Humans

(Toluene)



ACGIH-A4(2006) : Not Classifiable as a Human Carcinogen

Reproductive toxicity

[GHS Cat. Japan, base data]

(Ethanol)

cat. 1A; human : PATTY 6th, 2012

(Toluene)

cat. 1A; CERI/NITE risk assessment 87, 2006

(Toluene)

cat. add; SIDS(J), Access on Apr. 2012

STOT

STOT-single exposure

[cat.3 (resp. irrit.)]

[GHS Cat. Japan, base data]

(Ethanol)

respiratory tract irritation (PATTY 6th, 2012)

(Toluene)

respiratory tract irritation (PATTY 5th, 2001)

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

[GHS Cat. Japan, base data]

(Ethanol)

narcosis (PATTY 6th, 2012; SIDS, 2005)

(Toluene)

narcosis (EHC 52, 1985; IARC 47, 1989)

STOT-repeated exposure data is not available.

Aspiration hazard data is not available.

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## 12. Ecological Information

### Ecotoxicity

#### Aquatic toxicity

Hazardous to the aquatic environment (Acute)

[GHS Cat. Japan, base data]

(Ethanol)

Algae (Chlorella) EC50=1000mg/L/96hr (SIDS, 2005)

(Toluene)

Crustacea (Ceriodaphnia dubia) EC50=3.78mg/L/48hr (NITE primary risk assessment, 2006)

Hazardous to the aquatic environment (Long-term)

[GHS Cat. Japan, base data]

(Ethanol)

Crustacea (Ceriodaphnia reticulata) NOEC=9.6mg/L/10days (SIDS, 2005)

(Toluene)

Crustacea (Ceriodaphnia dubia) NOEC=0.74mg/L/7days (NITE primary risk assessment, 2006)

#### Water solubility

(Ethanol)

miscible (ICSC, 2000)

(Toluene)

none (ICSC, 2002)

#### Persistence and degradability

(Ethanol)

Degrade rapidly (BOD\_Degradation : 89% (Registered chemicals data check & review, 1993))

(Toluene)

BOD\_Degradation : 123% (Registered chemicals data check & review)

#### Bioaccumulative potential

(Ethanol)



log Pow=-0.32 (ICSC, 2000)  
(Toluene)  
log Kow=2.73 (PHYSPROP DB, 2008)

**Mobility in soil**

Mobility in soil data is not available.

**Other adverse effects**

Ozone depleting chemical data is not available.

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**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.

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**14. Transport Information**

UN No.: 2524

Proper Shipping Name :

ETHYL ORTHOFORMATE

Class or division : 3

Packing group : III

ERG GUIDE No.: 129

**IMDG Code (International Maritime Dangerous Goods Regulations)**

UN No.: 2524

Proper Shipping Name :

ETHYL ORTHOFORMATE

Class or division : 3

Packing group : III

**IATA Dangerous Goods Regulations**

UN No.: 2524

Proper Shipping Name :

ETHYL ORTHOFORMATE

Class or division : 3

Hazard labels : Flamm.liquid

Packing group : III

**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

Carcinogenicity: cat.1, 1A, 1B

Ethanol

Reproductive toxicity: cat.1, 1A, 1B

Ethanol

**Transport in bulk according to Annex II of MARPOL73/78 and IBC Code**

Noxious Liquid ; Cat. Y

Toluene

Noxious Liquid ; Cat. Z

Ethanol



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**15. Regulatory Information**

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

US Federal Regulations

Chemicals listed in TSCA Inventory

Ethanol; Toluene; Triethyl orthoformate

Other regulatory information

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

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**16. Other information**

GHS classification and labelling

Flam. Liq. 3: H226 Flammable liquid and vapor

Acute Tox. 4: H332 Harmful if inhaled

Carc. 1A: H350 May cause cancer

Repr. 1A: H360 May damage fertility or the unborn child

Reference Book

Globally Harmonized System of classification and labelling of chemicals, (6th ed., 2015), UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 20th edit., 2017 UN

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

IATA Dangerous Goods Regulations (61th Edition) 2020

Classification, labelling and packaging of substances and mixtures (Table 3 ECNO6182012)

2016 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2019 TLVs and BEIs. (ACGIH)

<http://monographs.iarc.fr/ENG/Classification/index.php>

Supplier's data/information

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 2018).