

Material Safety Data Sheet

Substance Name	CAS No.	KE No.	UN No.	EU No.
Triethylene glycol	112-27-6	KE-13201		203-953-2

1. Product and company identification

a) Product name : Triethylene glycol

b) Usage of product & use limit

Recommended product purpose : The air-hygiene facilities and the bacteriostatic agents: The number 3 inactive group of the Dem pesticides: The aroma ingredients and the viscosity increasing agents among the cosmetics: Used on diverse plastics for the increase of the flexibility: Among the vinyl, polyester, and polyurethane resins, the solvents and the plasticizers: The air disinfectants: The dehydration of the natural gas: The wetting agents among the printer inks : The extraction solvents: The disinfectants and the solvents for use with the nitrocellulose: The plasticizers among the cellophanes.

Product use limit: No data

c) Supplier information (address required if imported)

Company Name : Korea Petrochemical Ind. Co., Ltd.
(Onsan factory)

Location : 134 Onsan-ro, Onsan-eup, Ulju-gun, Ulsan

Emergency contact: +82-52-231-1225,
+82-52-231-1119 (24 hours)

2. Hazards identification

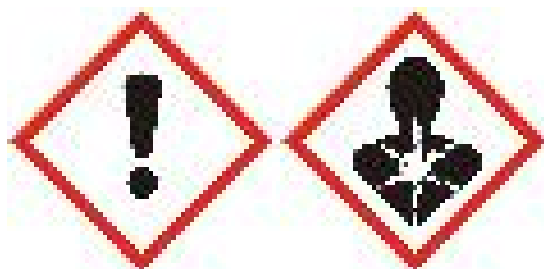
a) Hazard category:

Skin erosion /skin irritation : Category 2

Reproduction-toxicity : Category 2
Hazardous to the aquatic environment :
Chronic Hazard, Category 4.

b) Alarm notice item

Figures



Signal

Warning

Hazard notice

H315 Skin irritation

H361 Suspected of damaging fertility or fetus.

H413 It may cause long-term harmful influences to aquatic organisms.

Preventive alarm notice

<Prevention>

P201 Secure manual before operation

P202 Do not touch unless safety measure understood.

P264 Rinse after handling part.

P273 Do not discharge into the environment.

P280 Put on glove, safety garment, goggle, face protector.

P281 Put on proper personal safety equipment.

<Countermeasure>

P302+P352 Rinse the exposed with soap and water.

P308+P313 If exposed or risk, keep medical attention.

P321 Treat (...) immediately

P332+P313 If skin irritated, consult medical treatment.

P337+P313 Keep medical attention if eye irritated.

P362 Take off contaminated clothing and wash before put on.

P377 If fire by leaking gas, never try put out if fix the gas.

<Storage>

P405 Keep at storage with door locking system.

<Disposal>

P501 Discard contents container (as direction regulated).

c) Hazard not specified in toxicity classification

Health	1
Fire	1
React	0

3. Composition/Information on ingredients

Substance name : Triethylene glycol
Usual name : DI-BETA-HYDROXYETHOXYETHANE
CAS No. : 112-27-6
Contents (%) : 100%

4. First aid measures

- a) If eye contacted. : Get emergency medical attention.
If exposed to material, rinse skin and eye with water above 20 minutes.
- b) Skin contacted: Remove garments and footwear and evacuate from it.
If exposed to material, rinse skin and eye with water above 20 minutes.
If skin exposed, protect expansion.
Get emergency medical attention.
If hot, cool down the spot and rinse.
Get emergency medical treatment if skin irritation.
Take off contaminated garment, wash before put on.

- c) If inhaled: Please move to a place with fresh air.
Let warm and relax.
Consult physician if exposed or discomfort.
- d) If eaten or inhaled : Use oxygen respirator instead of mouth-to-mouth (CPR).
Consult physician if exposed or discomfort.
- e) Medical attention: Take medical emergency if exposed.
When other medical emergency take protective measure and treatment.

5. Fire-Fighting measures

- a) Proper extinguisher: For extinguishing by smothering, use dry sand or soil.
If fire took place, use alcohol foam, carbon dioxide, and water sprayer.
- b) Toxicity from chemicals
Container might exploded if heat added.
Hazardous gas occurs by flames during burning.
Non-flammables and material not burn but chance to produce corrosion/toxic fume if heated.
A part may burn but not ignited easily.
- c) Protective equipment for fire and prevention
Keep distance from tank fire using automatic extinguisher.
When tank fire extinguished, spray much water for cooling.
Stay away from tank if fire tank noise or decolorized.
Keep away from the tank in flames.
Move container if not dangerous.
For the disposal of the fire fighting water, dig a ditch and shut it up and be sure that the substances do not get scattered.

As a part can be transported at a high temperature, please be cautious.

In case of large scale tank fire, use manless fire extinguishing equipment and stay away keep tank burning.

Get out of the area and extinguish the fire by maintaining a safe distance.

The rescuers must wear the proper protective kits.

Please be cautious as it can be molten and transported.

6. Accidental release measures

a) Necessary measure & protection equipment

Wipe out immediately what has been spilt.

And follow the preventive measures in the protective kit clause.

Please eliminate all the sources of ignition.

If not dangerous, please stop the leak.

Please do not touch a damaged container or seepage without wearing the proper protective clothing.

Please stop the diffusion by covering with a plastic sheet.

Please prevent dust production.

Please pay attention to the substances that must be avoided and the conditions.

b) Measures to protect environment

Please prevent the inflow into the waterway, drains, basements, and closed spaces.

Please do not discharge into the environment.

c) Removal & cleaning

Please absorb the spill with an inert substance (For example, dry sand or dirt), and put it in a chemical waste container.

Please absorb the liquid, and please wash the contaminated area with a detergent and water.

When there is much leak, please make a ditch by having the seepage far away.

With a clean shovel, put the seepage in a clean and dry container. After closing loosely, please move the container away from the leakage area.

When there is a leakage of powder, please prevent the diffusion by covering with a plastic sheet. And please maintain in the dry condition.

When there is a small-amount leak, please absorb with sand or an inflammable substance and put it in the container.

7. Handling and storage

a) Safety handling

Even after the container has been emptied, as the residues of the product can remain, follow all the MSDS and label preventive measures.

Use by being cautious about the handling and the storage.

Before opening, please cautiously open the cork.

Please prevent a long-term or a continuous skin contact.

Please do not breathe in any steam that is generated from the heated substance.

If there is no proper ventilation, please do not enter the storage area.

After the handling, please thoroughly wash the handled part.

Please pay attention to the substances to be avoided and the conditions.

Please be cautious about the high temperature.

Please do not handle before reading all the words of the safety and prevention measures and understanding them.

b) Safety storage

Regarding the empty drums, please drain completely and block properly, thereby either turning them back to the drum adjuster immediately or arrange them properly.

Please store in a storage place which has a locking device.

8. Exposure controls & personal protection

a) Exposure standards on chemical & biological criteria

Domestic regulation : Do data

ACGIH regulation : Not applicable

Biological exposure standard : Not applicable

b) Proper engineering management

Facilitate washstand and shower where this chemical used.

Either isolate factory, ventilation or do engineering management as adjust air level below exposure norm.

c) Personal safety equipment

Respiratory protection : Put on respiratory protection device fits to exposed chemicals approved by KOSHA (Korea Occupational Safety & Health Agency)

Eye protection : No data

Hand protection : No data

Body protection : No data

9. Physical and chemical properties

a. outfit

type Liquid

color No color

b. odor odorless

c. odor meter (None)

d. pH (None)

e. melting/freezing point $-7^{\circ}\text{C} \sim -5^{\circ}\text{C}$

f. gap of initial boiling point between boiling point: 285°C

g. flash point 165°C

h. vapor speed	(No data)
I. Ignition (solid, vapor)	(No data)
j. Limit of explosion	0.9/9.2%
k. Steam pressure	0.00132 mmHg(25°C)
l. solubility	1000000 mg/l (solubleness)
m. Steam density	5.2
n. Gravity	1.1274(15/4 C)
o. n-Octanol/water digit.	-1.98
p. Self-ignition temp.	371°C
q. Dismantling temp.	(No data)
r. Viscosity	47.8cP (20°C)
s. Molecular weight	150.20

10. Stability and reactivity

a) Chemical stability & possible toxic reaction

Produce toxic gas after Decomposed at high temperature.

Container may explode by heating.

A part may burn but not ignited easily.

Non-flammables and material not burn but chance to produce corrosion/toxic fume if heated.

b) Precondition to avoid : Igniting source, heat, spark, flames.

c) Chemicals to avoid :

Flammable materials, reductant materials

d) Toxic substance from dissolution :

Produced toxic gas during burning by dissolution.

Corrosive /toxic hume

Irritant / toxic gas

11. Toxicological information

a) Information on exposing route many frequency

There is no information about the serious side effects.
It may cause nausea, vomiting, headache, drowsy, dizziness, renal abnormality, brain abnormality, convulsion and coma.
In case of short-time exposed, may cause light irritation.

b) Health hazard information

Acute toxicity

Oral : LD50 17000 mg/kg Rat

Percutaneous : LD50>5000 mg/kg Rabbit

Inhale : (No data)

Skin corrosive, irritant : Rabbit/ light irritant

Severe eye damage or irritation : Rabbit/ light irritant

Respiratory nervousness : No data

Skin nervousness : Human body/non-nervous

Carcinogenesis :

Industrial Safety and Health Act : No data

Ministry of employment & labor Notice : No data

IARC : No data

OSHA : No data

ACGIH : No data

NTP : No data

EU CLP : No data

Reproductive-cell variation : in-vitro/negative

Reproductive toxicity : Rat/ fetus influence

Specific organ toxic (1 time exposure) : No data

Specific organ toxic (repeated exposure): No data

Inhale toxicity : No data

12. Ecological information

a) Biological toxicity

Fish : LD50>10000 mg/l 96hr *Lepomis macrochirus*

Crustacean: LD50 46500 mg/l 48hr Daphnia magna
Fowls: (No data)

b) Residue & dissolution

Residual : log Kow -1.98

Dissolution : No data

c) Biological concentration

Concentration : BCF 1700

Bio-dissolution: 95(%) 14 day

d) Soil migration : No data

e) Other toxic effects : It may cause long-term very harmful influences to aquatic organisms.

13. Disposal considerations

a) Disposal method

1) Separate by water and oil in advance.

b) Disposal precaution

Discard the container of the material in accordance with the related law.

14. Transport information

a) UN No. : No data

b) Proper shipping code: Not applicable

c) Hazard grade in transportation : Not applicable

d) Container grade: Not applicable

e) Sea contamination substance: Not applicable

f) Safety measure for transportation: Not applicable

In fire emergency : Not applicable

Safety measure against spill : Not applicable

15. Regulatory information

- a) Restriction by Occupation Safety & Health Act: No data
- b) Restriction by Toxic Chemical Control Act: No data
- c) Restriction by Safety Control of Dangerous Substances Act
: 4 type No.3 petroleums (water solubility liquid) 4000ℓ
- d) Restriction by Waste Control Act: Specified waste materials
- e) Restriction by Domestic & Foreign conventions

<Domestic restriction>

Persistent Organic Pollutants Control Act : Not applicable

<Foreign restriction>

OSHA USA regulation : Not applicable

CERCLA USA regulation : Not applicable

EPCRA USA 302 regulation: Not applicable

EPCRA USA 304 regulation: Not applicable

EPCRA USA 313 regulation: Not applicable

USA regulation(Rotterdam agreement substance):Not applicable

USA regulation(Stockholm agreement substance):Not applicable

USA regulation(Montreal convention substance):Not applicable

EU classification info(Confirmed result):Not applicable

EU classification info(Hazard warning):Not applicable

EU classification info(Safety notice):Not applicable

16. Other information

a) Data source

IUCLID (oral)

IUCLID (percutaneous)

IUCLID (skin corrosive or irritant)

IUCLID (severe eye damage or irritant)

IUCLID (skin nervousness)

IUCLID (reproductive cell variation)

THOMSON (reproductive toxicity)

ECOTOX (fish)

IUCLID (crustacean)

ECOTOX (concentration)

OECD TG 302B, IUCLID (bio-dissolution)

b) Date of first preparation : April 1, 2013

c) Revised time & final revised date

Revised time : 0 time

Date of final revision :

d) Others :