

MATERIAL SAFETY DATA SHEET

1. Identification of the substance or mixture and of the supplier

A. GHS product identifier RainOK ANTI FOG SPRAY

B. Recommended use of the chemical and restrictions on use

Recommended use windshield of automobile

Restrictions on use Limitation of use for other purpose

C. Manufacturers

Company name Bullsone

Address 7F, Dabong Tower, 418, Teheran-ro Gangnam-gu, Seoul, 135-839, Korea

Emergency phone number 822-2106-7777

Respondent Han Dong Jin

Fax 822-2106-7911

2. Hazards identification

A. GHS classification of the substance/mixture

Flammable liquids : Category 2

Serious eye damage /eye irritation : Category 2A

Hazardous to the aquatic environment (acute hazard) : Category 3

B. GHS label elements, including precautionary statements

Pictogram and symbol :



Signal word : Danger

Hazard statements :

H225 Highly flammable liquid and vapour

H319 Causes serious eye irritation

H402 Harmful to aquatic life.

Precautionary statements

Precaution

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ventilating/lighting equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P264 Wash thoroughly after handling.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

Treatment

P303+P361+P353 If on skin (or hair): Remove/Take off immediately all contaminated clothing.

Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 If eye irritation persists: Get medical advice/attention.

P370+P378 In case of fire: Use fire-extinguishing agents. for extinction.

Storage

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

Disposal

P501 Dispose the contents/container in accordance with local/regional/national/international regulations.

C. Other hazard information not included in hazard classification (NFPA)

Health 2

Flammability 1

Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
Secret material				1 ~ 10
Diethylene glycol butyl ether	2-(2-Butoxyethoxy)ethanol	112-34-5	203-961-6	1 ~ 10
Ethanol	Ethyl alcohol	64-17-5		10~20
Preservatives	1,2-Benzisothiazolin-3-one(CAS No. 2634-33-5) +Propylene glycol(CAS No. 57-55-6) +Sodium hydroxide(CAS No. 1310-73-2) +Water(CAS No. 7732-18-5)			< 1
Water		7732-18-5	231-791-2	70 ~ 90

4. First aid measures

A. Eye contact

- 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.

B. Skin contact

- If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- Call emergency medical service.
- Remove and isolate contaminated clothing and shoes.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Wash skin with soap and water.

C. Inhalation

- Move victim to fresh air.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

- Keep victim warm and quiet.

D. Ingestion

- Call emergency medical service.

E. Indication of immediate medical attention and notes for physician

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. Fire fighting measures

A. Suitable (and unsuitable) extinguishing media

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.

B. Specific hazards arising from the chemical

- Highly flammable liquid and vapour
- May violently polymerize and result in fire and explosion.
- Vapors may travel to a source of ignition and ignite.
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.

C. Special protective equipment and precautions for fire-fighters

- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Many liquids are lighter than water.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas
- Substance may be transported hot.
- Substance may be transported in a molten form.
- Dike fire-control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.
- Fire involving Tanks; Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks; Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks; Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Fire involving Tanks; Always stay away from tanks engulfed in fire.
- Fire involving Tanks; For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures

- The very fine particles may cause a fire or explosion, eliminate all ignition sources.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- All equipment used when handling the product must be grounded.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- A vapor suppressing foam may be used to reduce vapors.
- Cover with plastic sheet to prevent spreading.
- Prevent dust cloud.

- Please note that there are materials and conditions to avoid.

B. Environmental precautions and protective procedures

- Prevent entry into waterways, sewers, basements or confined areas.

C. The methods of purification and removal

- Dike and collect water used to fight fire.
- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb the liquid and scrub the area with detergent and water.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- Use clean non-sparking tools to collect absorbed material.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
- Powder Spill; Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- Small Spill; Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

7. Handling and storage

A. Precautions for safe handling

- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Wash thoroughly after handling.
- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- All equipment used when handling the product must be grounded.
- Please note that there are materials and conditions to avoid.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to heat.
- You need measurement of air concentration and ventilation in low, closed and confined areas due to lack of oxygen.

B. Conditions for safe storage

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep container tightly closed.
- Store in a well-ventilated place. Keep cool.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Secret material

Ethanol TWA = 1000 ppm (1900 mg/m³)

Preservatives

(CAS No. 1310-73-2; Ceiling = 0.1 mg/m³)

ACGIH regulation

Diethylene glycol butyl ether TWA 10 ppm

Ethanol STEL 1000 ppm

Biological exposure index : Not available

OSHA regulation

Ethanol TWA = 1,000 ppm (1,900 mg/m³)

NIOSH regulation

Ethanol TWA = 1,000 ppm (1,900 mg/m³)

EU regulation

Diethylene glycol butyl ether TWA = 10 ppm, STEL = 15 ppm

Other

Diethylene glycol butyl ether Austria: TWA = 10 ppm, STEL= 15 ppm France: TWA = 10 ppm, STEL= 15 ppm Spain: TWA = 10 ppm, STEL= 15 ppm U.K: TWA = 10 ppm, STEL = 20 ppm Belgium: TWA = 10 ppm, STEL= 15 ppm

Ethanol U.K: TWA = 1,000 ppm Spain: TWA = 1,000 ppm France: TWA = 1,000 ppm Australia: TWA = 1,000 ppm Canada: TWA = 1,000 ppm

B. Appropriate engineering controls

- Facilities for storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

C. Personal protective equipment

Respiratory protection

- Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.
- In case exposed to gaseous/liquid material, the respiratory protective equipments as follow are recommended. escape full facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or escape half facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or direct full facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) half facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or powered air-purifying gas mask.
- In lack of oxygen(< 19.5%), wear the supplied-air respirator or self-contained breathing apparatus.oxygen

Eye protection

- Wear enclosed safety goggles to protect from gaseous state organic material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

Body protection

- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. Physical and chemical properties

A. Appearance

Description Liquid

Color

B. Odor

C. Odor threshold Not available

D. pH 8.5 ± 1.0

E. Melting point/freezing point -2 °C ~ -5 °C

F. Initial boiling point and boiling range 78 °C

G. Flash point Not available

H. Evaporation rate Not available

I. Flammability (solid, gas) Not applicable

J. Upper/lower flammability or explosive limits Not available

K. Vapor pressure Not available

L. Solubility (ies) g/100g

M. Vapor density Not available

N. Specific gravity 0.986±0.003

O. Partition coefficient: n-octanol/water Not available

P. Auto ignition temperature Not available

Q. Decomposition temperature Not available

R. Viscosity Not available

S. Molecular weight Not available

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions:

- Highly flammable liquid and vapour
- May violently polymerize and result in fire and explosion.
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.
- Fire will produce irritating, corrosive and/or toxic gases.

B. Conditions to avoid:

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

C. Incompatible materials:

- Combustibles, reducing agents

D. Hazardous decomposition products:

- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- Corrosive and/or toxic fume

11. Toxicological information

A. Information of Health Hazardous:**Acute toxicity**

Oral [Not classified] (ATEmix = 85,316.37 mg/kg bw)

- **Secret material** : Rat LD₅₀ > 2,000 mg/kg (subtoxic)
- **Diethylene glycol butyl ether** : Mouse LD₅₀ = 5,530 mg/kg (OECD TG 401)
- **Ethanol** : Rat LD₅₀ = 10,470 mg/kg (OECD TG 401)

Dermal [Not classified] (ATEmix = 98,140.37 mg/kg bw)

- **Secret material** : Rat LD₅₀ > 2,000 mg/kg (subtoxic)
- **Diethylene glycol butyl ether** : Rabbit LD₅₀ = 2,764 mg/kg (OECD TG 402)
- **Ethanol** : Rabbit LD₅₀ = 17,100 mg/kg

Inhalation [Not classified] (ATEmix = 145.87 mg/L)

- **Secret material** : Rat LC₅₀ = 2 mg/L/4hr , Rat LC50 > 11.78 mg/L/4hr (5% dilute solution)
- **Ethanol** : Rat LC₅₀ = 116.9 mg/L/4hr (OECD TG 403)

Skin corrosion/ irritation [Not classified]

-**Secret material** : Not irritating to skin. (rabbit)

-**Diethylene glycol butyl ether** : In skin irritation test with rabbits, slight irritations were observed. (OECD TG 404, GLP)

- **Ethanol** : In skin irritation test with rabbits, skin irritations were not observed. (OECD TG 404, GLP)

- **Preservatives** : Skin corrosion or irritation substance.

Serious eye damage/ irritation [Not available]

-**Secret material** : Severe irritation. (rabbit)

-**Diethylene glycol butyl ether** : In eyes irritation test with rabbits, irritations were observed.

- **Ethanol** : In eyes irritation test with rabbits, moderate irritations were observed. (OECD TG 405, GLP)

- **Preservatives** : Serious eye damage or irritation substance.

Respiratory sensitization [Not classified]

Skin sensitization [Not classified]

-**Secret material** : Did not induce sensitisation reactions in laboratory animals (Guinea Pig).

-**Diethylene glycol butyl ether** : In maximisation test with guinea pigs, the study showed no evidence that 2 -(2 -butoxyethoxy)ethanol causes adverse skin sensitisation reactions. (OECD TG 406)

- **Ethanol** : In skin sensitisation test with guinea pigs, skin sensitisation reactions were not observed.

- **Preservatives** : Skin sensitization substance.

Carcinogenicity [Not classified]

IARC

- **Ethanol** : Group 1 (in alcoholic beverages)

ACGIH

- **Ethanol** : A3

KOREA-ISHL

- **Ethanol** : 1A

Preservatives : (1,2-Benzisothiazol-3(2H)-one): In acute toxicity test and structually, carcinogenic hazards were not observed.

Mutagenicity [Not classified]

- **Secret material** : - Polyalkyleneoxide modified Heptamethyltrisiloxane : Ames test - Negative / Chinese Hamster Ovary HGPRT gene mutation assay - Negative / Mammalian cytogenetic test - Negative(in vitro), micronucleus cytogenetic assay - Negative(in vivo)

- **Diethylene glycol butyl ether** : Negative reactions were observed in both in vitro(mammalian cell gene mutation assay(OECD TG 476,GLP), chromosome aberration assay(OECD TG 473), bacterial reverse mutation assay(OECD TG 471)) and in vivo(micronucleus assay(OECD TG 475)).

- **Ethanol** : Negative reactions were observed in vitro(bacterial reverse mutation assay (OECD TG 471), mammalian cell gene mutation assay (OECD TG 476)) and in vivo(micronucleus assay (OECD TG 474)).

Reproductive toxicity [Not classified]

- **Diethylene glycol butyl ether** : In reproductive/developmental toxicity with rats, there was no significant evidence for developmental toxicity. (OECD TG 414/415)

- **Ethanol** : In reproductive toxicity test with mice, there was no significant evidence for reproductive toxicity. (OECD TG 416)

- **Preservatives** : (1,2-Benzisothiazol-3(2H)-one): In an repeated dose toxicity study with animal, teratogenic or fetotoxic effects were not observed.

Specific target organ toxicity (single exposure) [Not classified]

- **Diethylene glycol butyl ether** : In acute inhalation toxicity with rats, no signs of mortality or adverse clinical signs. (OECD TG 403)

- **Ethanol** : In acute inhalation toxicity with rats, very low acute toxicity effects were observed. (OECD TG 403)

- **Preservatives** : No information on significant side effects. Can induce irritation and allergic reactions.

Specific target organ toxicity (repeat exposure) [Not classified]

- **Secret material** : In repeated dermal application test with rats, there were no evidence of toxic effects to specific target organs. As a result of 14-day of feeding, repeated consumption of high doses induced reversible side-effects in male and female reproductive organs. In repeated aerosol inhalation toxicity test with rats for 9 days(NOEL < 0.025 mg/L), rale, spasms, blurry sights, dehydration, hypothermia, weight loss and decreased food consumption, changes in clinical pathology parameters, decreased weight of thymus, and minute lesions and other toxic effects in the nasal cavity were seen.

- **Diethylene glycol butyl ether** : In repeated inhalation toxicity study with rats for 90 days, no adverse effects were seen in any dose group. (OECD TG 413, GLP)

- **Ethanol** : In repeated oral toxicity study with rats for 14 weeks, repeated toxicity related effects were not observed. (OECD TG 408, GLP)

Aspiration Hazard [Not classified]

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Category 3] (ATEmix = 28.31109mg/l)

- Chronic toxicity : [Not classified]

Fish

- **Secret material** : 96hr-LC₅₀ (*Brachydaniorerio*) = 2.75 mg/L , 96hr-LC50 (*Lepomismacrochirus*) = 6 mg/L

- **Diethylene glycol butyl ether** : 96hr-LC₅₀ = 1300 mg/L (OECD TG 203)

- **Ethanol** : 96hr-LC₅₀ = 14200 mg/L

crustacean

- **Secret material** : 48hr-EC₅₀ (*Daphnia magna*) = 37 mg/L , 48hr-EC50 (*Daphnia similis*) = 22.71 mg/L

- **Diethylene glycol butyl ether** : 48hr-LC₅₀ > 100 mg/L (GLP)

- **Ethanol** : 48hr-LC₅₀ = 5012 mg/L , 48hr-NOEC(*Daphnia magna*) = 9.6 mg/L

Algae

- **Secret material** : 96hr-EC₅₀ (*Selenastrumcapricornutum*) = 5.5 mg/L , 96hr-NOEC (*Selenastrumcapricornutum*) = 1 mg/L

- **Diethylene glycol butyl ether** : 96hr-EC₅₀ > 100 mg/L (OECD TG 201, GLP)

- **Ethanol** : 96hr-LC₅₀ = 675 mg/L (OECD TG 201)

B. Persistence and degradability

Persistence

- **Diethylene glycol butyl ether** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 1) (OECD TG 117, GLP)

- **Ethanol** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -0.35) (24 °C) (OECD TG 107)

Degradability

- **Preservatives** : (1,2-Benzothiazol-3(2H)-one): In Bunch and Chabers Test, BIT(5 ppm) can be decomposed into two harmless metabolite by organisms. There are evidences of degradability(in soil) and photodecomposition(in water).

C. Bioaccumulative potential

Bioaccumulation

- **Diethylene glycol butyl ether** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3) (estimated)

- **Ethanol** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF < 10)

- **Preservatives** : (1,2-Benzothiazol-3(2H)-one): Not likely to bioaccumulate.

Biodegradation

- **Secret material** : This product does not easily biodegrade.

- **Diethylene glycol butyl ether** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 85% biodegradation was observed after 28 days) (OECD TG 301C)

- **Ethanol** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 96% biodegradation was observed after 20 days)

D. Mobility in soil

- **Diethylene glycol butyl ether** : Low potency of mobility to soil. (Koc = 48)

- **Ethanol** : Low potency of mobility to soil. (Koc = 0.13 ~ 0.61)

E. Other hazardous effect

Not available

13. Disposal considerations

A. Disposal method

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

B. Disposal precaution

- Consider the required attentions in accordance with waste treatment management regulation.

14. Transport information

A. UN Number 1993

B. UN Proper shipping name FLAMMABLELIQUID, N.O.S.

C. Transport Hazard class 3

- D. Packing group** II
- E. Marine pollutant** NO
- F. Special precautions**
 - in case of fire F-E
 - in case of leakage S-E

15. Regulatory information

A. Occupational Safety and Health Regulation

Secret material :Administration subject listed ;
Secret material :Occupational exposure limits listed ;
Secret material :Work environment monitoring listed (6 months) ;
Secret material :Health examination agent (12 months) ;
Preservatives :Administration subject listed CAS No. 1310-73-2
Preservatives :Work environment monitoring listed (6 months); CAS No. 1310-73-2
Preservatives :Occupational exposure limits listed CAS No. 1310-73-2

B. Toxic Chemical Control Act

Secret material :Existing Chemical Substance ; CAS No. 27306-78-1: KE-25355/CAS No. 67-63-0:
KE-29363
Diethylene glycol butyl ether :Existing Chemical Substance KE-10466
Ethanol :Existing Chemical Substance (KE-13217)
Preservatives :Existing Chemical Substance ; CAS No. 2634-33-5: KE-02680/CAS No. 57-55-6: KE-
29267/CAS No. 1310-73-2: KE-31487/CAS NO. 7732-18-5: KE-35400
Preservatives :Toxic Chemicals ; CAS No. 1310-73-2: 97-1-136 (5% or more in mixtures)
Water :Existing Chemical Substance (KE-35400)

C. Dangerous Material Safety Management Regulation

Secret material :Dangerous Material Safety Management Regulation CAS No. 67-63-0; Alcohols
class 4 400ℓ
Diethylene glycol butyl ether :Dangerous Material Safety Management Regulation 4000ℓ
Ethanol :Dangerous Material Safety Management Regulation 400ℓ
Preservatives :Dangerous Material Safety Management Regulation CAS No. 57-55-6; Petroleum class
4-3 (water soluble liquid) 4000ℓ/ CAS No. 1310-73-2; Non-dangerous goods

D. Wastes Control Act

Diethylene glycol butyl ether :Wastes Control Act
Ethanol :Wastes Control Act Controlled Wastes
Preservatives :Wastes Control Act CAS No. 2634-33-5; Controlled wastes / CAS No. 1310-73-2;
Controlled wastes

E. Other regulation (internal and external)

Internal information

Persistent Organic Pollutants Acts Not regulated

External information

EU classification(classification)
Diethylene glycol butyl ether :Classification Xi; R36
Ethanol :Classification F; R11
Preservatives :Classification Xn; R22Xi;R38-41R43N;R50
Water :Classification Not classified

EU classification(risk phrases)
Diethylene glycol butyl ether :Hazard statements R36
Ethanol :Hazard statements R11
Preservatives :Hazard statements R22 R38 R41 R43 R50
Water :Hazard statements Not applicable

EU classification(safety phrases)
Diethylene glycol butyl ether :Precautionary statements S2, S24, S26
Ethanol :Precautionary statements S2 S7 S16
Preservatives :Precautionary statements S2 S24 S26 S37/39 S61
Water :Precautionary statements Not applicable

EU SVHC list Not regulated
EU Authorisation List Not regulated

EU Restriction list

Diethylene glycol butyl ether :EU Restriction list Regulated

U.S.A management information (OSHA Regulation)

Preservatives :OSHA1910 300lb

U.S.A management information (CERCLA Regulation) Not regulated**U.S.A management information (EPCRA 302 Regulation)** Not regulated**U.S.A management information (EPCRA 304 Regulation)** Not regulated**U.S.A management information (EPCRA 313 Regulation)**

Preservatives :EPCRA 313 78lb

Substance of Roterdame Protocol Not regulated**Substance of Stockholm Protocol** Not regulated**Substance of Montreal Protocol** Not regulated**Foreign Inventory Status****Secret material**

U.S.A management information Section 8(b) Inventory (TSCA): Present

Japan management information Existing and New Chemical Substances (ENCS): Present

China management information Inventory of Existing Chemical Substances (IECSC): Present

Canada management information Domestic Substances List (DSL): Present

Australia management information Inventory of Chemical Substances (AICS): Present

New Zealand management information Inventory of Chemicals (NZLoc): Present

Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Diethylene glycol butyl ether

U.S.A management information Section 8(b) Inventory (TSCA): Present

Japan management information Existing and New Chemical Substances (ENCS): (7)-97, (2)-422

China management information Inventory of Existing Chemical Substances (IECSC): Present

Canada management information Domestic Substances List (DSL): Present

Australia management information Inventory of Chemical Substances (AICS): Present

New Zealand management information Inventory of Chemicals (NZLoc): HSNO Approval: HSR001075

Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Ethanol

U.S.A management information Section 8(b) Inventory (TSCA): Present

Japan management information Existing and New Chemical Substances (ENCS): (2)-202

China management information Inventory of Existing Chemical Substances (IECSC): Present

Canada management information Domestic Substances List (DSL): Present

Australia management information Inventory of Chemical Substances (AICS): Present

New Zealand management information Inventory of Chemicals (NZLoc): HSNO Approval: HSR001144

Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Water

U.S.A management information Section 8(b) Inventory (TSCA): Present

Japan management information Industrial Safety and Health Law Substances (ISHL): 2-(4)-1220

China management information Inventory of Existing Chemical Substances (IECSC): Present 32224

Canada management information Domestic Substances List (DSL): Present

Australia management information Inventory of Chemical Substances (AICS): Present

New Zealand management information Inventory of Chemicals (NZLoc): May be used as a single component chemical under an appropriate group standard.

Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

16. Other information

A. Information source and references

AKRON; <http://ull.chemistry.uakron.edu/erd>

American Conference of Governmental Industrial Hygienists TLVs and BEIs.

Chemical safe administration data book (The Chemical Daily Co., Ltd.)

Emergency Response Guidebook 2008;

http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf

Korea Occupational Health & Safety Agency; <http://www.kosha.net>

National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>

National Emergency Management Agency-Korea dangerous material inventory management system; <http://www.nema.go.kr/hazmat/main/main.jsp>

SILWET L-77 AG MSDS (Description) , (Color) , (Odor) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Flash point) , (Evaporation rate) , (Vapor pressure) , (Solubility (ies)) , (Vapor density) , (Specific gravity) , (Partition coefficient: n-octanol/water) , (Viscosity) , (Oral) , (Dermal) , (Inhalation) , (Skin corrosion/ irritation) , (Serious eye damage/ irritation) , (Skin sensitization) , (Mutagenicity) , (Specific target organ toxicity (repeat exposure)) , (Fish) , (crustacean) , (Algae) , (Biodegradation)

UN Recommendations on the transport of dangerous goods 17th
Waste Control Act enforcement regulation attached [1]

American Conference of Governmental Industrial Hygienists TLVs and BEIs.
EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>

Korea Occupational Health & Safety Agency; <http://www.kosha.net>

NIOSH Pocket Guide; <http://www.cdc.gov/niosh/npg/npgdcas.html>

National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>

National Emergency Management Agency-Korea dangerous material inventory management system; <http://www.nema.go.kr/hazmat/main/main.jsp>

National Toxicology Program; http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm

REACH information on registered substances; <http://apps.echa.europa.eu/registered/registered-sub.aspx#search> (Color) , (Odor) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Flash point) , (Solubility (ies)) , (Specific gravity) , (Partition coefficient: n-octanol/water) , (Auto ignition temperature) , (Viscosity) , (Oral) , (Dermal) , (Skin corrosion/ irritation) , (Serious eye damage/ irritation) , (Skin sensitization) , (Mutagenicity) , (Reproductive toxicity) , (Specific target organ toxicity (single exposure)) , (Specific target organ toxicity (repeat exposure)) , (Fish) , (crustacean) , (Algae) , (Persistence) , (Biodegradation)

TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp> (EU regulation)

U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB) ;
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm> (Vapor density) , (Molecular weight) , (Bioaccumulation) , (Mobility in soil)

U.S. National library of Medicine(NLM) Hazardous Substances Data Bank(HSDB);
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB> (pH)

Waste Control Act enforcement regulation attached [1]

American Conference of Governmental Industrial Hygienists TLVs and BEIs.
EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>

Emergency Response Guidebook 2008;
http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>

Korea Occupational Health & Safety Agency; <http://www.kosha.net>

National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>

National Emergency Management Agency-Korea dangerous material inventory management system; <http://www.nema.go.kr/hazmat/main/main.jsp>

National Toxicology Program; http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm

REACH information on registered substances; <http://apps.echa.europa.eu/registered/registered-sub.aspx#search> (Description) , (Color) , (Odor) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Flash point) , (Upper/lower flammability or explosive limits) , (Vapor pressure) , (Solubility (ies)) , (Specific gravity) , (Partition coefficient: n-octanol/water) , (Auto ignition temperature) , (Viscosity) , (Oral) , (Dermal) , (Inhalation) , (Skin corrosion/ irritation) , (Serious eye damage/ irritation) , (Skin sensitization) , (Mutagenicity) , (Reproductive toxicity) , (Specific target organ toxicity (single exposure)) , (Specific target organ toxicity (repeat exposure)) , (Fish) , (crustacean) , (Algae) , (Persistence) , (Bioaccumulation) , (Biodegradation) , (Mobility in soil)

TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp>

The Chemical Database -The Department of Chemistry at the University of Akron;
<http://ull.chemistry.uakron.edu/erd/> (Odor threshold) , (Vapor density) , (Molecular weight) , (Incompatible materials)

UN Recommendations on the transport of dangerous goods 17th
Waste Control Act enforcement regulation attached [1]

CDI MSDS (Description) , (Color) , (Odor) , (pH) , (Melting point/freezing point) , (Specific gravity) , (Skin corrosion/ irritation) , (Serious eye damage/ irritation) , (Skin sensitization) , (Carcinogenicity) ,

(Reproductive toxicity) , (Specific target organ toxicity (single exposure)) , (Degradability) ,
(Bioaccumulation)
Corporate Solution From Thomson Micromedex; <http://csi.micromedex.com>
ECOTOX; <http://cfpub.epa.gov/ecotox/>
European Union Risk Assessment Report (RAR); <http://esis.jrc.ec.europa.eu/>
Handbook of Industrial Poisoning.Korea :Sinkwang
International Programme on Chemical Safety(IPCS) International Chemical Safety Cards (ICSCs);
<http://www.inchem.org/>
International Uniform Chemical Information Database(IUCLID); <http://esis.jrc.ec.europa.eu/>
Korea Occupational Health & Safety Agency; <http://www.kosha.net>
National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>
National Emergency Management Agency-Korea dangerous material inventory management system;
<http://www.nema.go.kr/hazmat/main/main.jsp>
The Chemical Database -The Department of Chemistry at the University of Akron;
<http://ull.chemistry.uakron.edu/erd/>
U.S. National library of Medicine(NLM); <http://toxnet.nlm.nih.gov>
Waste Control Act enforcement regulation attached [1]
AKRON; <http://ull.chemistry.uakron.edu/erd> (Description) , (Color) , (Melting point/freezing point) ,
(Initial boiling point and boiling range) , (Vapor pressure) , (Vapor density) , (Specific gravity) ,
(Viscosity) , (Molecular weight)
American Conference of Governmental Industrial Hygienists TLVs and BEIs.
EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>
Korea Occupational Health & Safety Agency; <http://www.kosha.net>
NIOSH Pocket Guide; <http://www.cdc.gov/niosh/npg/npgdcas.html>
National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>
National Emergency Management Agency-Korea dangerous material inventory management system;
<http://www.nema.go.kr/hazmat/main/main.jsp>
National Toxicology Program; http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm
TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp>
Waste Control Act enforcement regulation attached [1]

B. Issuing date Oct29, 2013

C. Revision number and date

revision number 1

date of the latest revision 2014.07.16

D. Others

- Revised Material Safety Data Sheet based on the amendments made on the Ministry of Employment and Labor Public Notice on Standard for Classification Labeling of Chemical Substance and Material Safety Data Sheet.
- This MSDS is authored in pursuant to the Article 41 of the Occupational Safety and Health Act.
- The content is based on the latest information and knowledge that we currently possess.
- This MSDS was authored to aid buyer, processor or any other third person who handles the chemical of subject in the MSDS; additionally, it does not warrant suitability of the chemical for special purposes or the commercial use of statements that approves the use of it in combination with other chemicals as well as technical or legal liabilities.