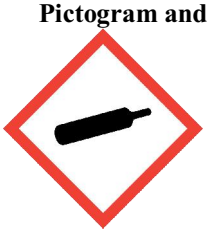
MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier CAREJAM LEATHER CLEANER & LOTION
B. Recommended use of the chemical and restrictions on use
Recommended use clean and protection of leather surface
Restrictions on use Limitation of use for other purpose
C. Supplier
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
Gases under pressure : Liquefied gas
Hazardous to the aquatic environment (acute hazard) : Category 2
B. GHS label elements, including precautionary statements
Pictogram and symbol :



Signal word : Warning
Hazard statements :
H280 Contains gas under pressure; may explode if heated.
H401 Toxic to aquatic life.
Precautionary statements
Precaution
P273 Avoid release to the environment.
Treatment : Not applicable
Storage
P410+P403 Protect from sunlight. Store in a well-ventilated place.
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 0
Flammability 1
Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
Water	Dihydrogen oxide	7732-18-5	231-791-2	55~65 %
White Mineral Oil Liquid Paraffin		8042-47-5	232-455-8	3~8 %
Polysiloxane	Dimethylpolysiloxane Silastic	63148-62-9	613-156-5	1~10 %

	Silicone oil			
Polyoxyethylenealkylether	Ethoxylated alcohols, C12-14-secondary	84133-50-6		1~5 %
Anionic surfactant				1~10 %
1-butoxypropan-2-ol	Propylene glycol monobutyl ether	5131-66-8	225-878-4	1~5 %
GLYCEROL	Glycerine	56-81-5	200-289-5	1~5 %
Ethanol	Ethyl alcohol	64-17-5		1~5 %
Propane	Dimethylmethan	74-98-6	200-827-9	1~10 %
Butane	Butan	106-97-8	203-448-7	1~10 %

4. First aid measures

A. Eye contact
- Call emergency medical service.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

B. Skin contact
- Call emergency medical service.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

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

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
- Contains gas under pressure; may explode if heated.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Fire will produce irritating, corrosive and/or toxic gases.
- Some of these materials, if spilled, may leave a flammable residue after evaporation

C. Special protective equipment and precautions for fire-fighters
- Evacuate area and fight fire from a safe distance.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Ruptured cylinders may rocket.
- Move containers from fire area if you can do it without risk.
- Fire involving Tanks; Do not direct water at source of leak or safety devices; icing may occur.
- 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.
- Damaged cylinders should be handled only by specialists.

- Use extinguishing agent suitable for type of surrounding fire.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- 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
- Large Spill; Dike far ahead of liquid spill for later disposal.
- 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
- 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.
- Please note that there are materials and conditions to avoid.
- Please work with reference to engineering controls and personal protective equipment.

B. Conditions for safe storage
- Protect from sunlight. Store in a well-ventilated place.
- Containers can build up pressure if exposed to heat (fire).

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Fragrance CAS No. 64-17-5; TWA: 20 ppm (85 mg/m³) STEL: 40 ppm (170 mg/m³)
GLYCEROL TWA = 10 mg/m³
Ethanol TWA = 1000 ppm (1900 mg/m³)

ACGIH regulation

TRIETHANOLAMINE TWA 5 mg/m³
GLYCEROL TWA 10 mg/m³ (mist)
Ethanol STEL 1000 ppm
Butane STEL 1000 ppm

Biological exposure index : Not available

OSHA regulation

GLYCEROL TWA = 15 mg/m³(mist, total particulate), 5 mg/m³(mist, respirable fraction)
Ethanol TWA = 1,000 ppm (1,900 mg/m³)
Propane TWA=1000 ppm (1800 mg/m³)
Butane TWA = 800 ppm, (1900 mg/m³)

NIOSH regulation

GLYCEROL TWA = 10 mg/m³ (mist, as an 8-hour TWA)
Ethanol TWA = 1,000 ppm (1,900 mg/m³)
Propane TWA=1000 ppm (1800 mg/m³)
Butane TWA = 800 ppm, (1900 mg/m³)

EU regulation : Not available

Other

TRIETHANOLAMINE Belgium: TWA = 5 mg/m³ Australia: TWA = 5 mg/m³ Canada: TWA = 5 mg/m³ Czech Republic: TWA = 5 mg/m³, Ceiling = 10 mg/m³ Denmark: TWA = 0.5 ppm(3.1 mg/m³) Germany: MAK = 5 mg/m³ (inhalable fraction)

1-butoxypropan-2-ol Czech Republic : TWA = 270 mg/m³ Ceiling = 550 mg/m³

GLYCEROL Australia : TWA=10 mg/m³ Canada : TWA=10 mg/m³ France : TWA=10 mg/m³ Germany : TWA=100 mg/m³ Greece : TWA=10 mg/m³

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

Propane Finland:TWA=800 ppm(1500 mg/m³) Germany:TWA=1000 ppm(1800 mg/m³) Greece:TWA=1000 ppm(1800 mg/m³) Hong Kong:TWA-2500 ppm(4508 mg/m³)

Butane Germany : TWA=1000ppm(2400 mg/m³) Greece : TWA=1000ppm(2350 mg/m³) Hong Kong : TWA=800ppm(1900 mg/m³)

B. Appropriate engineering controls

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 7.0 ~ 8.0

E. Melting point/freezing point Not available

F. Initial boiling point and boiling range Not available

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) Not available

M. Vapor density Not available

N. Specific gravity Not available

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:
- Contains gas under pressure; may explode if heated.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Fire will produce irritating, corrosive and/or toxic gases.

B. Conditions to avoid:
- Heat

C. Incompatible materials:

D. Hazardous decomposition products:
- Irritating, corrosive and/or toxic gases

11. Toxicological information

A. Information of Health Hazardous:

Acute toxicity

Oral Not classified (ATEmix = 19,901.52 mg/kg bw)

- **White Mineral Oil Liquid Paraffin** : Rat LD_{50} > 5,000 mg/kg (OECD TG 401, GLP)
- **Polysiloxane** : Rat LD_{50} > 5,000 mg/kg
- **Fragrance** : LD_{50} = 4,391 mg/kg
- **Polyoxyethylenealkylether** : Rat LD_{50} = 2,100 mg/kg
- **Anionic surfactant** : Rat LD_{50} = 3,879 mg/kg (Estimate)
- **TRIETHANOLAMINE** : Rat LD_{50} = 6,400 mg/kg (OECD TG 401)
- **1-butoxypropan-2-ol** : Rat LD_{50} = 3,300 mg/kg (OECD TG 401, GLP)
- **GLYCEROL** : Rat LD_{50} = 27,200 mg/kg (female)
- **Preservatives** : Rat LD_{50} = 2,834 mg/kg (male)
- **Preservatives** : Rat LD_{50} = 1,100 mg/kg
- **Ethanol** : Rat LD_{50} = 10,470 mg/kg (OECD TG 401)

Dermal Not classified (ATEmix = 10,524.16 mg/kg bw)

- **White Mineral Oil Liquid Paraffin** : Rabbit LD_{50} > 2,000 mg/kg (OECD TG 402, GLP)
- **Polysiloxane** : Rabbit LD_{50} > 10,000 mg/kg Acute toxicity is very low
- **Fragrance** : LD_{50} = 3,246,753 mg/kg
- **Anionic surfactant** : Rabbit LD_{50} = 1,969 mg/kg (Estimate)
- **TRIETHANOLAMINE** : Rabbit LD_{50} > 2,000 mg/kg (OECD TG 402)
- **1-butoxypropan-2-ol** : Rat LD_{50} > 2,000 mg/kg (OECD TG 402, GLP)
- **GLYCEROL** : Guinea pig LD_{50} = 56,750 mg/kg
- **Preservatives** : Rabbit LD_{50} > 5,000 mg/kg
- **Preservatives** : Rabbit LD_{50} > 2,000 mg/kg
- **Ethanol** : Rabbit LD_{50} = 17,100 mg/kg

Inhalation Not classified (ATEmix = 7,296.22 mg/L)

- **White Mineral Oil Liquid Paraffin** : Rat LC_{50} > 5 mg/L/4hr (OECD TG 403, GLP)
- **Polysiloxane** : Rat LC_{50} > 535 mg/L Acute toxicity is very low
- **Fragrance** : LC_{50} = 8,481 mg/L/4hr
- **1-butoxypropan-2-ol** : Rat LC_{50} > 651 ppm/4hr (OECD TG 403, GLP)
- **GLYCEROL** : Rat LC_{50} > 2.75 mg/L/4hr (male)
- **Ethanol** : Rat LC_{50} = 116.9 mg/L/4hr (OECD TG 403)
- **Propane** : Rat LC_{50} = 280,000 mg/kg/10min
- **Butane** : Rat LC_{50} = 1,443 mg/L/15min

Skin corrosion/ irritation Not classified

- **White Mineral Oil Liquid Paraffin** : In test on skin irritation with rabbits, skin irritations were not observed.(OECD TG 404, GLP)
- **Polysiloxane** : In test on skin irritation with rabbits, skin irritations were not observed.
- **Polyoxyethylenealkylether** : Causes skin irritation.
- **TRIETHANOLAMINE** : In test on skin irritation with rabbits, skin irritations were not observed.(OECD TG 404)
- **1-butoxypropan-2-ol** : In skin irritation test with rabbits, moderate dermal irritations were observed.(erythema score = 2.7, edema score = 1.3)(OECD TG 404, GLP)
- **GLYCEROL** : In test on skin irritation with rabbits, skin irritations were not observed.
- **Preservatives** : Skin disease patient's dynamic data: Irritation Positive reaction.
- **Ethanol** : In skin irritation test with rabbits, skin irritations were not observed. (OECD TG 404, GLP)

Serious eye damage/ irritation Not available

- **White Mineral Oil Liquid Paraffin** : In test on eyes irritation with rabbits, eyes irritations were net observed.
- **Polysiloxane** : In test on eyes irritation with rabbits, eyes irritations were not observed.
- **Polyoxyethylenealkylether** : Causes serious eye irritation.
- **TRIETHANOLAMINE** : Recent animal studies indicate that TEA is only a 'slight' eye irritant and therefore this effect is not of concern.
- **1-butoxypropan-2-ol** : In eye irrtaion test with rabbits, slightly eye irritations were observed. (cornea score=1, iris score=0.9, conjunctivae score=2.7, chemosis score=0.7)(OECD TG 405, GLP)
- **GLYCEROL** : In test on eyes irritation with rabbits, eyes irritations were not observed.
- **Preservatives** : Rabbit Corrosive
- **Preservatives** : 21 days post-treatment, unwashed rabbit eyes showed severe irritation due to corneal opacity and vascularization.
- **Ethanol** : In eyes irritation test with rabbits, moderate irritations were observed. (OECD TG 405, GLP)

Respiratory sensitization Not classified

Skin sensitization Not classified

- **White Mineral Oil Liquid Paraffin** : In Buehler test with guinea pigd, skin sensitisation were not observed.(OECD TG 406, GLP)
- **Polysiloxane** : In skin sensitisation test with animals, skin sensitization were not observed.
- **TRIETHANOLAMINE** : In Guinea pig maximisation test under OECD TG 406, triethanolamine is not a skin sensitizer in animals.(GLP)
- **1-butoxypropan-2-ol** : In Buehler test with guinea pigs, skin sensitisations were not observed. (OECD TG 406, GLP)
- **Preservatives** : In patch test between years 1996~1999 in 3168 people, positive results were seen.
- **Ethanol** : In skin sensitisation test with guinea pigs, skin sensitisation reactions were not observed.

Carcinogenicity Not classified

IARC

- TRIETHANOLAMINE : Group 3
- Ethanol : Group 1 (in alcoholic beverages)

ACGIH

- Ethanol : A3

KOREA-ISHL

- Ethanol : 1A

White Mineral Oil Liquid Paraffin : No neoplastic or other significant histological changes were observed in animals.(OECD TG 453, GLP)

TRIETHANOLAMINE : There was no evidence of carcinogenicity by oral (up to 1000 mg/kg/day for 104 weeks, and up to 3334 mg/kg/day for 82 weeks amongst rats and mice respectively) or dermal routes (dose unknown) in studies of 14-18 months duration using rats and mice.

GLYCEROL : In carcinogenicity test with rat, the result gave no evidence of a cancerogenic potential in rat.

Preservatives : From short-term experiments and structural aspect, assumptionhas been made that it will not be carcinogenic in human body.

Mutagenicity Not classified

- **White Mineral Oil Liquid Paraffin** : Negative reactions were observed in vitro test(Bacterial Reverse Mutation Assay(OECD TG 471))and in vivo test(micronucleus assay(OECD TG 474)).
- **Polysiloxane** : Ames test results negative
- **TRIETHANOLAMINE** : In vitro(bacterial reverse mutation assay, DNA damage and/or repair, chromosome aberration, mammalian cell gene mutation assay) : negative / In vivo genotoxicity is not anticipated.
- **1-butoxypropan-2-ol** : Negative reactions were observed in in vitro tests(bacterial reverse mutation assay(OECD TG 471, GLP), mammalian chromosome aberration test(OECD TG 473, GLP), and mammalian cell gene mutation test(OECD TG 476, GLP)).
- **GLYCEROL** : Negative reactions were observed in in vitro test(Chromosomal aberrations test(OECD TG 473), unscheduled DNA synthesis test(OECD TG 482), Ames test(OECD TG 471, GLP)).
- **Preservatives** : Non-mutagenic Active ingredient.
- **Preservatives** : In in vitro Salmonella typhimurium Ames test, negative genotoxicity was observed (with or without metabolic activation).
- **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)).
- **Propane** : Negative reactions were observed with and without metabolic activation in vitro(mammalian chromosome aberration test(OECD TG 473, GLP), bacterial reverse mutation assay(OECD TG 471, GLP).
- **Butane** : Negative reactions were observed with and without metabolic activation in vitro(mammalian chromosome aberration test(OECD TG 473, GLP), bacterial reverse mutation assay(OECD TG 471, GLP).

Reproductive toxicity Not classified

- **White Mineral Oil Liquid Paraffin** : In developmental toxicity study, No adverse effects were noted on reproductive parameters or on the in utero suvival or development of the offspring.(OECD TG 414)
- **TRIETHANOLAMINE** : There was no evidence of developmental toxicity in the offspring of pregnant rats and mice (exposed during the major period of organogenesis to up to 30 mg/kg/day, and to 1125 mg/kg/day respectively using the oral route). There were no abnormalities noted in the histopathological examination of reproductive organs (testes and ovaries) in the 90-day oral and dermal toxicity studies.
- **1-butoxypropan-2-ol** : In prenatal developmental toxicity study with rats, test material did not induce developmental effects up to 1.0 ml/kg bw/day(OECD TG 414, GLP).
- **GLYCEROL** : In reproductive/developmental oral toxicity study, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEL =8000-10000 mg/kg bw)
- **Preservatives** : Increased death before implantation, decreasing fetal survival and hollow foot, cardiovascular abnormalities, hydrocephalus, increased rate of hyoid bone occurrence were noted.
- **Ethanol** : In reproductive toxicity test with mice, there was no sigificant evidence for reproductive toxicity. (OECD TG 416)
- **Propane** : In reproduction/developmental toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEC = 9000 ppm)(OECD TG 422, GLP)
- **Butane** : In reproduction/developmental toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEC=21641 mg/m^3)(OECD TG 422, GLP)

Specific target organ toxicity (single exposure) Not classified

- **White Mineral Oil Liquid Paraffin** : No mortality was observed during the study period.Clinical signs included labored breathing, rales, partial closing of the eyes, nasal discharge, recumbency, and incoordination. All animals appeared normal at day 5 after exposure and

throughout the remainder of the study period.(OECD TG 403, GLP)
- **TRIETHANOLAMINE** : In acute inhalation toxicity test with 12 rats, chronic bronchitis was observed in a rat, but no findings were observed in all other rats. (OECD TG 403)
- **1-butoxypropan-2-ol** : In acute oral toxicity test with rats, signs of toxicity were lethargy, comatose, hypopnoea, gasping respiration and rough coat. For surviving animals these signs were reversible within 2 days.(OECD TG 401, GLP)
- **GLYCEROL** : In acute oral toxicity test with rats, Muscle spasms and clonic convulsions were observed.
- **Preservatives** : When inhaled, induces irritation in respiratory system.
- **Ethanol** : In acute inhalation toxicity with rats, very low acute toxicity effects were observed. (OECD TG 403)
- **Propane** : In acute inhalation toxicity test with rats, acute toxic effects were not observed.

Specific target organ toxicity (repeat exposure) Not classified

- **White Mineral Oil Liquid Paraffin** : In a 90-day dermal toxicity study, There were no other compound-related effects on mortality, clinical signs, food consumption, organ weights, clinical chemistry.(OECD TG 411, GLP)
- **TRIETHANOLAMINE** : Mild skin irritations were observed following repeated exposures using the dermal route. Comparison of the NOAELs and LOAELs with anticipated exposure levels for humans in the occupational and consumer settings did not give cause for concern.
- **1-butoxypropan-2-ol** : In 28/14day-repeated dose inhalation toxicity test with rats, there were no substance-related effects(OECD TG 412, GLP).
- **GLYCEROL** : In repeated oral toxicity test with rats, In the male rats was an increase in the final liver/body weight ratio and upon microscopic examination generalized cloudy swelling and hypertrophy of the parenchymal cells was observed. The only effect in the female rats on this level was some generalized cloudy selling upon microscopic examination of the liver.
- **Preservatives** : In repeated dermal toxicity test(NOEL=50mg/kg), and repeated oral toxicity test(NOEL=20mg/kg) with rats for 90 days, clinical manifestation and side-effects such as hepatic and intestinal hyperplasia, cardiomyopathy, etc. were observed.
- **Ethanol** : In repeated oral toxicity study with rats for 14 weeks, repeated toxicity related effects were not observed. (OECD TG 408, GLP)
- **Propane** : In repeated inhalation toxicity study with rats for 28 days, repeated toxicity related effects were not observed.(OECD TG 422, GLP)
- **Butane** : In repeated inhalation toxicity study with rats for 28 days, repeated toxicity related effects were not observed.(NOAEC = 9,000 ppm)(OECD TG 422, GLP)

Aspiration Hazard Not classified

12. Ecological information

A. Ecological toxicity

- Acute toxicity : Category 2 (ATEmix = 1.33932mg/ℓ)
- Chronic toxicity : Not classified

Fish

- **White Mineral Oil Liquid Paraffin :** 96hr-LC_{50} (*Lepomis macrochirus*) > 10000 mg/L
- **Polyoxyethylenealkylether :** 96hr-LC_{50} = 3.7 mg/L
- **Anionic surfactant :** 96hr-LC_{50} = 4.36 mg/L
- **TRIETHANOLAMINE :** 96hr-LC_{50} = 1180 mg/L
- **1-butoxypropan-2-ol :** 96hr-LC_{50} = 560 ~ 1000 mg/L (OECD TG 203, GLP)
- **GLYCEROL :** 96hr-LC_{50} = 54000 mg/L
- **Preservatives :** 96hr-LC_{50} = 4.77 mg/L (active ingredient)(OECD TG 203), 96hr-LC50 (Lepomis macrochirus) = 10 mg/L (active ingredient)
- **Preservatives :** 96hr-LC_{50} = 0.067 mg/L
- **Ethanol :** 96hr-LC_{50} = 14200 mg/L
- **Propane :** 96hr-LC_{50} = 27.98 mg/L (Estimated)

crustacean

- **Polyoxyethylenealkylether :** 48hr-EC_{50} (*Daphnia magna*) = 0.29 mg/L
- **Anionic surfactant :** 48hr-EC_{50} = 20 mg/L
- **TRIETHANOLAMINE :** 24hr-LC_{50} = 1386 mg/L

- **1-butoxypropan-2-ol :** 48hr-EC_{50} > 1000 mg/L (OECD TG 202, GLP)
- **GLYCEROL :** 48hr-EC_{50} = 1955 mg/L
- **Preservatives :** 48hr-EC_{50} = 0.160 mg/L
- **Ethanol :** 48hr-LC_{50} = 5012 mg/L , 48hr-NOEC(Daphnia magna) = 9.6 mg/L
- **Propane :** 48hr-LC_{50} = 14.22 mg/L (Estimated)

Algae

- **Polyoxyethylenealkylether :** 96hr-EC_{50} (*Scenedesmus subspicatus*) = 0.05 mg/L
- **Anionic surfactant :** 96hr-EC_{50} = 4 mg/L
- **TRIETHANOLAMINE :** 72hr-LC_{50} = 216 mg/L
- **1-butoxypropan-2-ol :** 96hr-EC_{50} > 1000 mg/L (GLP), 96h-NOEC (Selenastrum capricornutum) = 560 mg/L (GLP)
- **Preservatives :** 96hr-EC_{50} = 1.978 mg/L
- **Ethanol :** 96hr-LC_{50} = 675 mg/L (OECD TG 201)
- **Propane :** 96hr-EC_{50} = 7.71 mg/L (Estimated)

B. Persistence and degradability

Persistence

- **White Mineral Oil Liquid Paraffin** : High persistency (log Kow is more than 4 estimated.) (Log Kow = 4.27) (estimated)
- **Polyoxyethylenealkylether** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 3.32) (estimated)
- **TRIETHANOLAMINE** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -1.59)
- **1-butoxypropan-2-ol** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 1.2)
- **GLYCEROL** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -1.75) (25 °C)(OECD TG 107)
- **Preservatives** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.4)
- **Ethanol** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -0.35) (24 °C) (OECD TG 107)
- **Propane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.8) (pH 7)(20 ℃)

Degradability

- **TRIETHANOLAMINE** : Half-life in air - 4 hours, Half-life in soil - 14 days, Half-life in water - 14 days
- **Preservatives** : Half life in an aerobic aquatic microcosm: 9 hr

C. Bioaccumulative potential

Bioaccumulation

- **White Mineral Oil Liquid Paraffin** : Bioaccumulation is expected to be high according to the BCF ≥ 500 (BCF = 1216) (estimated)
- **Polyoxyethylenealkylether** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 72.51) (estimated)
- **TRIETHANOLAMINE** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3)
- **1-butoxypropan-2-ol** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3.162) (estimated)
- **GLYCEROL** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3.162) (Estimated)
- **Preservatives** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 36)
- **Ethanol** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF < 10)

Biodegradation

- **TRIETHANOLAMINE** : ready biodegradability (aerobic)
- **1-butoxypropan-2-ol** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 90% biodegradation was observed after 28 days) (OECD TG 301 E, GLP)
- **GLYCEROL** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 60% biodegradation was observed after 2 hrs)
- **Ethanol** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 96% biodegradation was observed after 20 days)
- **Propane** : As not well-biodegraded, it is expected to have high accumulation potential in living organisms (= 50% biodegradation was observed after 2 days) (Q)SAR
- **Butane** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 100% biodegradation was observed after 385 hrs)

D. Mobility in soil

- **White Mineral Oil Liquid Paraffin** : High potency of mobility to soil. (Koc = 31280) (estimated)
- **Polyoxyethylenealkylether** : Low potency of mobility to soil. (Koc = 78.9) (estimated)
- **TRIETHANOLAMINE** : Low potency of mobility to soil. (Koc = 3)
- **1-butoxypropan-2-ol** : Low potency of mobility to soil. (Koc = 9.228) (estimated)
- **GLYCEROL** : Low potency of mobility to soil. (Koc = 0.1345) (estimated)
- **Preservatives** : Low potency of mobility to soil. (Koc = 269.15)
- **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 1950
B. UN Proper shipping name AEROSOLS
C. Transport Hazard class 2
D. Packing group
E. Marine pollutant No
F. Special precautions
in case of fire F-D
in case of leakage S-U

15. Regulatory information

A. Occupational Safety and Health Regulation

Fragrance : Occupational exposure limits listed
Fragrance : Work environment monitoring listed CAS No. 123-92-2 / CAS No. 100-42-5
GLYCEROL : Occupational exposure limits listed
Butane : Occupational exposure limits listed

B. Toxic Chemical Control Act

Water : Existing Chemical Substance (KE-35400)
White Mineral Oil Liquid Paraffin : Existing Chemical Substance (KE-35412)
Polysiloxane : Existing Chemical Substance (KE-31068)
Fragrance : Existing Chemical Substance ; CAS No. 115-95-7: KE-11622/ CAS No. 1335-46-2: KE-24309/ CAS No. 80-54-6; KE-11394/ CAS No. 91-64-5: KE-02718/ CAS No. 106-25-2: KE-11600/ CAS No. 120-51-4: KE-02782/ CAS No. 60-12-8: KE-28354/ CAS No. 78-70-6: KE-11592/ CAS No. 64-17-5: KE-13217/ CAS No. 105-87-3: KE-11608/ CAS No. 118-58-1: KE-02824/ CAS No. 123-92-2: KE-23580/ CAS No. 100-42-5: KE-35342
Fragrance : Non-Toxic Chemicals ; CAS No. 28219-61-6: (2000-3-1536)
Polyoxyethylenealkylether : Existing Chemical Substance (KE-00456)
Anionic surfactant : Existing Chemical Substance ; CAS No. 151-21-3: KE-21884/ CAS No. 7732-18-5: KE-35400
TRIETHANOLAMINE : Existing Chemical Substance KE-25940
1-butoxypropan-2-ol : Existing Chemical Substance (KE-04165)
GLYCEROL : Existing Chemical Substance (KE-29297)
Preservatives : Existing Chemical Substance ; CAS No. 2682-20-4: KE-24316/CAS No. 7732-18-5: KE-35400
Preservatives : Toxic Chemicals ; CAS No. 2682-20-4: 2012-1-645(1% or more in mixtures)
Preservatives : Existing Chemical Substance ; CAS No. 55406-53-6: KE-21042

Ethanol : Existing Chemical Substance (KE-13217)

C. Dangerous Material Safety Management Regulation

Fragrance : Dangerous Material Safety Management Regulation CAS No. 115-95-7; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 1335-46-2; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 80-54-6; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 106-25-2; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 120-51-4; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 60-12-8; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 78-70-6; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 64-17-5; Alcohols class 4 400ℓ / CAS No. 105-87-3; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 118-58-1; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 123-92-2; Petroleum class 4-2 (non-water soluble liquid) 1000ℓ / CAS No. 100-42-5; Petroleum class 4-2 (non-water soluble liquid) 1000ℓ

TRIETHANOLAMINE : Dangerous Material Safety Management Regulation 4000 ℓ

GLYCEROL : Dangerous Material Safety Management Regulation 4000ℓ

Ethanol : Dangerous Material Safety Management Regulation 400ℓ

D. Wastes Control Act

White Mineral Oil Liquid Paraffin : Wastes Control Act Controlled wastes

Preservatives : Wastes Control Act CAS No. 2682-20-4; Controlled wastes

Ethanol : Wastes Control Act Controlled Wastes

E. Other regulation (internal and external)

Internal information

Persistant Organic Pollutants Acts Not regulated

External information

EU classification(classification)

Water : Classification Not classified

White Mineral Oil Liquid Paraffin : Classification Not classified

1-butoxypropan-2-ol : Classification Xi; R36/38

GLYCEROL : Classification Not classified

Ethanol : Classification F; R11

Propane : Classification F+; R12

Butane : Classification F+; R12

EU classification(risk phrases)

Water : Hazard statements Not applicable

White Mineral Oil Liquid Paraffin : Hazard statements Not applicable

1-butoxypropan-2-ol : Hazard statements R36/38

GLYCEROL : Hazard statements Not applicable

Ethanol : Hazard statements R11

Propane : Hazard statements R12

Butane : Hazard statements R12

EU classification(safety phrases)

Water : Precautionary statements Not applicable

White Mineral Oil Liquid Paraffin : Precautionary statements Not applicable

1-butoxypropan-2-ol : Precautionary statements S(2)

GLYCEROL : Precautionary statements Not applicable

Ethanol : Precautionary statements S2 S7 S16

Propane : Precautionary statements S2, S9, S16

Butane : Precautionary statements S2, S9, S16

EU SVHC list Not regulated

EU Authorisation List Not regulated

EU Restriction list

Propane : EU Restriction list Regulated

U.S.A management information (OSHA Regulation) Not regulated

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 Regulated

Substance of Roterdame Protocol Not regulated

Substance of Stockholme Protocol Not regulated

Substance of Montreal Protocol Not regulated

Foreign Inventory Status

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 (NZIoC): May be used as a single component chemical under an appropriate group standard.
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

White Mineral Oil Liquid Paraffin

Canada management information Domestic Substances List (DSL): Present
China management information Inventory of Existing Chemical Substances (IECSC): Present
Australia management information Inventory of Chemical Substances (AICS): Present
U.S.A management information Section 8(b) Inventory (TSCA): Present
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present
New Zealand management information Inventory of Chemicals (NZIoC): May be used as a single component chemical under an appropriate group standard.

Polysiloxane

U.S.A management information Section 8(b) Inventory (TSCA): Present [XU]
Japan management information Existing and New Chemical Substances (ENCS): (7)-476
China management information Inventory of Existing Chemical Substances (IECSC): Present 08512
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present
New Zealand management information Inventory of Chemicals (NZIoC): Inventory of Chemicals (NZIoC): HSNO Approval: HSR003036
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Polyoxyethylenealkylether

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (7)-79
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 (NZIoC): HSNO Approval: HSR003537
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

TRIETHANOLAMINE

Australia management information Inventory of Chemical Substances (AICS): Present
Canada management information Domestic Substances List (DSL): Present
China management information Inventory of Existing Chemical Substances (IECSC): Present 29507
Japan management information Existing and New Chemical Substances (ENCS): (2)-308
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present
U.S.A management information Section 8(b) Inventory (TSCA): Present
New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR002785

1-butoxypropan-2-ol

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (7)-97

China management information Inventory of Existing Chemical Substances (IECSC): Present 06478
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present
New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001419
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

GLYCEROL

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (2)-242
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 (NZIoC): May be used as a single component chemical under an appropriate group standard.
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 (NZIoC): HSNO Approval: HSR001144
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Propane

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (2)-3
China management information Inventory of Existing Chemical Substances (IECSC): Present 03571
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present
New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001010
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Butane

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (2)-4
China management information Inventory of Existing Chemical Substances (IECSC): Present 41372
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present
New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR000989
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

16. Other information

A. Information source and references

EPISUITE v4.1; http://www.epa.gov/opt/exposure/pubs/episuitedl.htm
National Emergency Management Agency-Korea dangerous material inventory management system; http://www.nema.go.kr/hazmat/main/main.jsp
Korea Occupational Health & Safety Agency; http://www.kosha.net

ECOTOX; http://cfpub.epa.gov/ecotox/
http://www.epa.govt.nz/search-databases/Pages/ccid-details.aspx?SubstanceID=5783
National Chemicals Information System; http://ncis.nier.go.kr/ncis/
TOMES; http://www.rightanswerknowledge.com/loginRA.asp
American Conference of Governmental Industrial Hygienists TLVs and BEIs.
National Institute of Technology and Evaluation(NITE); http://www.safe.nite.go.jp/english/db.html
International Chemical Safety Cards(ICSC)(http://www.hihs.go.jp/ICSC)
EU CLP; http://esis.jrc.ec.europa.eu/index.php?PGM=cla
Wet tissue Preservatives MSDS
Momentive Performance materials MSDS
Ecological Structure Activity Relationships(ECOSAR)
International Programme on Chemical Safety(IPCS) International Chemical Safety Cards (ICSCs); http://www.inchem.org/
U.S. National library of Medicine(NLM) Hazardous Substances Data Bank(HSDB); http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
Emergency Response Guidebook 2008; http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf
http://www.biryong.co.kr/datacenter/chemistry/15-S-7.pdf
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; http://monographs.iarc.fr
OECD SIDS; http://webnet.oecd.org/hpv/ui/Search.aspx
AKRON; http://ull.chemistry.uakron.edu/erd
Industrial biocide MSDS
TOMES-LOLI®; http://www.rightanswerknowledge.com/loginRA.asp
TaiDong C&S MSDS
CHARABOT MSDS
Waste Control Act enforcement regulation attached [1]
The Chemical Database -The Department of Chemistry at the University of Akron; http://ull.chemistry.uakron.edu/erd/
National Toxicology Program; http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm
NIOSH Pocket Guide; http://www.cdc.gov/niosh/npg/npgdcas.html
REACH information on registered substances; http://apps.echa.europa.eu/registered/registered-sub.aspx#search
REACH information on registered substances; http://apps.echa.europa.eu/registered/registered-sub.aspx
International Uniform Chemical Information Database(IUCLID); http://esis.jrc.ec.europa.eu/
UN Recommendations on the transport of dangerous goods 17th

B. Issuing date 2014.10.08.

C. Revision number and date

revision number

date of the latest revision

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.

•The content of the MSDS may vary depending on the country or the region and may not coincide with the actual regulations. Therefore, the buyer or the processor of the chemical is responsible for observing responsible government's or the region's regulations.