

MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier GRASSE L'ESTEREL WHITE MUSK

B. Recommended use of the chemical and restrictions on use

Recommended use Air freshener

Restrictions on use Use only as intended

C. Manufacturers

Company name Bullson

Address 7F, Dabong Tower, 418, Teheran-roGangnam-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

Hazardous to the aquatic environment (chronic) : Category 3

B. GHS label elements, including precautionary statements

Pictogram and symbol :



Signal word : Danger

Hazard statements :

H225 Highly flammable liquid and vapour

H412 Harmful to aquatic life with long lasting effects.

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.

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.

P370+P378 In case of fire: Use Alcohol foam / carbon dioxide / water spray / dry sand or soil 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 0

Flammability 1

Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
Ethanol	Ethyl alcohol	64-17-5	-	< 50 %
Nonionic surfactant	Ethoxylated castor oil, hydrogenated	61788-85-0	500-147-5	< 10 %
Fragrance	Fragrance Mixture	-	-	< 20 %
Water	Water	7732-18-5	231-791-2	< 50 %

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

- 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.
- 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.
- 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.
- Fire will produce irritating, corrosive and/or toxic gases.

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.
- Some may be transported hot.
- 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.
- Do not touch or walk through spilled material.
- Eliminate all ignition sources.
- All equipment used when handling the product must be grounded.
- Stop leak if you can do it without risk.
- A vapor suppressing foam may be used to reduce vapors.
- Prevent dust cloud.
- Please note that there are materials and conditions to avoid.

B. Environmental precautions and protective procedures

- Avoid release to the environment.
- 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.
- 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 high temperature.
- 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.

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Ethanol TWA = 1000 ppm (1900 mg/m³)

ACGIH regulation

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 : Not available

Other

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

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 Colorless, Tranparent

B. Odor Perfume Odor

C. Odor threshold Not available

D. pH Not available

E. Melting point/freezing point Not available

- F. Initial boiling point and boiling range** > 80 °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/100L Soluble(in water)
M. Vapor density Not available
N. Specific gravity 0.92
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.
- 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:

D. Hazardous decomposition products:

- Irritating and/or toxic gases
- Irritating, corrosive and/or toxic gases

11. Toxicological information

A. Information of Health Hazardous:

Acute toxicity

Oral [Not classified] (ATEmix = 16,034.88 mg/kg bw)

- **Ethanol** : Rat LD₅₀ = 10,470 mg/kg (OECD TG 401)

Dermal [Not classified] (ATEmix = 16,850.73 mg/kg bw)

- **Ethanol** : Rabbit LD₅₀ = 17,100 mg/kg

Inhalation [Not classified] (ATEmix = 215.86 mg/L)

- **Ethanol** : Rat LC₅₀ = 116.9 mg/L/4hr (OECD TG 403)

Skin corrosion/ irritation [Not available]

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

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

Serious eye damage/ irritation [Not available]

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

Respiratory sensitization [Not classified]

Skin sensitization [Not classified]

-**Ethanol** : In skin sensitisation test with guinea pigs, skin sensitisation reactions were not observed.
Carcinogenicity [Not classified]

IARC

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

ACGIH

-**Ethanol** : A3

KOREA-ISHL

-**Ethanol** : 1A

Mutagenicity [Not classified]

-**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)).

- **Nonionic surfactant** : Negative reactions were observed in in Bacterial reverse mutation test and mutagenicity test with E-coli.

Reproductive toxicity [Not classified]

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

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

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

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

-**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 : [Not classified] (ATEmix = 237.88367mg/l)

- Chronic toxicity : [Category 3]

Fish

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

Crustacean

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

- **Nonionic surfactant** : 48hr-EC₅₀ > 100 mg/L (OECD TG 202)

Algae

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

- **Nonionic surfactant** : 72hr-EC₅₀ > 100 mg/L (OECD TG 201)

B. Persistence and degradability

Persistence

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

- **Nonionic surfactant** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -0.76)

Degradability Not available

C. Bioaccumulative potential

Bioaccumulation

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

Biodegradation

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

- **Nonionic surfactant** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (80% ~ 90% biodegradation was observed after 20 days) (OECD TG 301)

D. Mobility in soil

- **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 FLAMMABLE LIQUID, 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 Not regulated

B. Toxic Chemical Control Act

Ethanol :Existing Chemical Substance (KE-13217)

Nonionic surfactant :Existing Chemical Substance (KE-05137)

fragrance :Non-Toxic Chemicals ; CAS No. 319002-92-1; 2009-3-4028/ CAS No. 63500-71-0; 2005-3-3059

fragrance : Existing Chemical Substance ; CAS No. 1222-05-5; KE-18564/CAS No. 78-70-6; KE-11592/CAS No. 140-11-4; KE-02778/CAS No. 110-27-0; KE-33355/CAS No. 105-95-3; KE-12000/CAS No. 32210-23-4; KE-11375/CAS No. 60-12-8; KE-28354/CAS No. 21145-77-7; KE-33463/CAS No. 121-32-4; KE-13375/CAS No. 150-84-5; KE-11682/CAS No. 104-67-6; KE-18358

Water :Existing Chemical Substance (KE-35400)

C. Dangerous Material Safety Management Regulation

Ethanol :Dangerous Material Safety Management Regulation 400ℓ

fragrance : Dangerous Material Safety Management Regulation CAS No. 1222-05-5; Petroleum class 4-3/CAS No. 78-70-6; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ/CAS No. 140-11-4; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ/CAS No. 110-27-0; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ/CAS No. 105-95-3; Petroleum class 4-4 6000ℓ/CAS No. 32210-23-4; 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. 121-32-4; Non-dangerous goods/CAS No. 150-84-5; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ/CAS No. 104-67-6; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ

D. Wastes Control Act

Ethanol :Wastes Control Act Controlled Wastes

E. Other regulation (internal and external)

Internal information

Persistent Organic Pollutants Acts Not regulated

External information

EU classification(classification)

Ethanol :Classification F; R11

Nonionic surfactant :Classification Not classified

Water :Classification Not classified

EU classification(risk phrases)

Ethanol :Hazard statements R11

Nonionic surfactant :Hazard statements Not applicable

Water :Hazard statements Not applicable

EU classification(safety phrases)

Ethanol :Precautionary statements S2 S7 S16

Nonionic surfactant :Precautionary statements Not applicable

Water :Precautionary statements Not applicable

EU SVHC list Not regulated

EU Authorisation List Not regulated

EU Restriction list Not 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) Not regulated

Substance of Roterdame Protocol Not regulated

Substance of Stockholme Protocol Not regulated

Substance of Montreal Protocol Not regulated

Foreign Inventory Status

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

Nonionic surfactant

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

Japan management information Existing and New Chemical Substances (ENCS): (7)-1443; (8)-603

China management information Inventory of Existing Chemical Substances (IECSC): Present 40175

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

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

16. Other information

A. Information source and references

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

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]
American Conference of Governmental Industrial Hygienists TLVs and BEIs.
EPISUITE v4.1; <http://www.epa.gov/opt/exposure/pubs/episuitedl.htm> (Molecular weight)
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
SIGMA-ALDRICH; <http://www.sigmaaldrich.com/united-states.html> (Color) , (Odor) , (pH) , (Melting point/freezing point) , (Flash point) , (Solubility (ies)) , (Specific gravity) , (Partition coefficient: n-octanol/water) , (Decomposition temperature) , (Skin corrosion/ irritation) , (Mutagenicity) , (crustacean) , (Algae) , (Persistence) , (Biodegradation)
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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
OECD SIDS; <http://webnet.oecd.org/hpv/ui/Search.aspx> (Description) , (Color) , (Odor) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Flash point) , (Flammability (solid, gas)) , (Upper/lower flammability or explosive limits) , (Vapor pressure) , (Solubility (ies)) , (Specific gravity) , (Partition coefficient: n-octanol/water) , (Auto ignition temperature) , (Molecular weight) , (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) , (Bioaccumulation) , (Biodegradation)
REACH information on registered substances; <http://apps.echa.europa.eu/registered/registered-sub.aspx> (Viscosity)
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/> (Vapor density)
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EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>

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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>
 International Uniform Chemical Information Database(IUCLID); <http://esis.jrc.ec.europa.eu/> (Fish)
 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> (Description) , (Color) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Flash point) , (Vapor pressure) , (Solubility (ies)) , (Specific gravity) , (Partition coefficient: n-octanol/water) , (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)) , (crustacean) , (Algae) , (Persistence) , (Bioaccumulation) , (Biodegradation) , (Mobility in soil)
 TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp> (Other)
 The Chemical Database -The Department of Chemistry at the University of Akron;
<http://ull.chemistry.uakron.edu/erd/> (Upper/lower flammability or explosive limits) , (Auto ignition temperature) , (Incompatible materials)
 U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB) ;
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm> (Odor) , (Vapor density) , (Molecular weight)
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 National Emergency Management Agency-Korea dangerous material inventory management system;
<http://www.nema.go.kr/hazmat/main/main.jsp>
 OECD SIDS; <http://webnet.oecd.org/hpv/ui/Search.aspx>
 RIFM database
 Supplier Information
 UN Recommendations on the transport of dangerous goods 17th
 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 2013.11.21

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.