

MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier GRASSE VALENTINE BULGARIAN ROSE

B. Recommended use of the chemical and restrictions on use

Recommended use Air Freshener

Restrictions on use Do not use it other than the use

C. Manufacturers

Company name Bullstone

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

Emergency phone number 822-2106-7777

Respondent Han Dong Jin

2. Hazards identification

A. GHS classification of the substance/mixture

Skin sensitization : Category 1

Hazardous to the aquatic environment (chronic) : Category 3

B. GHS label elements, including precautionary statements

Pictogram and symbol :



Signal word : Warning

Hazard statements :

H317 May cause an allergic skin reaction.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statements

Precaution

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

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

Treatment

P302+P352 If on skin: Wash with plenty of soap and water.

P321 Specific treatment (see First Aid Measures on Safety Data Sheet).

P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

P363 Wash contaminated clothing before reuse.

Storage : Not applicable

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 Not available

Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common	CAS number	EC number	Content
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	Name(Synonyms)			(%)
Water	Water	7732-18-5	231-791-2	< 90.00 %
Gellan gum	-	71010-52-1	275-117-5	< 1.00 %
Propane-1,2-diol	Propylene glycol	57-55-6	200-338-0	< 10.00 %
Ethanol	-	64-17-5	-	< 5.00 %
Nonionic surfactant	Ethoxylated castor oil, hydrogenated	61788-85-0	500-147-5	< 5.00 %
Fragrance	Fragrance Mixture	-	-	< 10.00 %

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 skin irritation or rash occurs: Get medical advice/attention.
- Wash contaminated clothing before reuse.
- For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
- 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.
- For minor skin contact, avoid spreading material on unaffected skin.

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

- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- 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.

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.
- Substance may be transported in a molten form.
- 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

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- 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

- Avoid release to the environment.
- Prevent entry into waterways, sewers, basements or confined areas.

C. The methods of purification and removal

- 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.
- 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

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Contaminated work clothing should not be allowed out of the workplace.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Avoid prolonged or repeated contact with skin.
- 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.

B. Conditions for safe storage

- 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

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

Propane-1,2-diol Latvia: TWA = 7 mg/m³ Canada: TWA = 10 mg/m³ TWA = 50 ppm (aerosol and vapor), TWA = 155 mg/m³(aerosol and vapor) Ireland: TWA = 150ppm(mg/m³), TWA = 10mg/m³(particulate), TWA = 10mg/m³ (particulate).

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 particulate material, the respiratory protective equipments as follow are recommended. ;facepiece filtering respirator or air-purifying respirator, high-efficiency particulate air(HEPA) filter media or respirator equipped with powered fan, filter media of use(dust, mist, fume)
- In lack of oxygen(< 19.5%), wear the supplied-air respirator or self-contained breathing apparatus.oxygen

Eye protection

- Wear breathable safety goggles to protect from particulate 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 Solid

Color Milky-White

B. Odor Aromatic Odor

C. Odor threshold Not available

D. pH Not available

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:

- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- 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:

- Heat, sparks or flames

C. Incompatible materials:

- Combustibles, reducing agents

D. Hazardous decomposition products:

- Corrosive and/or toxic fume
- 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 = 243,706.09 mg/kg bw)

- **Propane-1,2-diol** : Rat LD₅₀ = 22,000 mg/kg
- **Ethanol** : Rat LD₅₀ = 10,470 mg/kg (OECD TG 401)
- **Fragrance** : LD₅₀ = 294,551 mg/kg

Dermal [Not classified] (ATEmix = 24,639.77 mg/kg bw)

- **Propane-1,2-diol** : Rabbit LD₅₀ > 2,000 mg/kg
- **Ethanol** : Rabbit LD₅₀ = 17,100 mg/kg

Inhalation [Not classified] (ATEmix = 11,690 mg/L)

- **Propane-1,2-diol** : Rabbit LC₅₀ > 158.5 mg/m³/4hr (LC50 > 317042 mg/m³ air/2h)
- **Ethanol** : Rat LC₅₀ = 116.9 mg/L/4hr (OECD TG 403)

Skin corrosion/ irritation [null]

- **Propane-1,2-diol** : In skin irritation test with rabbits, skin irritations were not observed(OECD TG 404).
- **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 [null]

- **Propane-1,2-diol** : In eyes irritation test with rabbits, eyes irritations were not observed(OECD TG 405).
- **Ethanol** : In eyes irritation test with rabbits, moderate irritations were observed. (OECD TG 405, GLP)

Respiratory sensitization [Not classified]

Skin sensitization [Category 1]

- **Propane-1,2-diol** : In skin sensitisation test with guinea pigs, skin sensitisations were not observed(OECD TG 406).
- **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]

- **Propane-1,2-diol** : Negative reactions were observed in both in vitro-Mammalian Chromosome Aberration Test(OECD TG 473), bacterial reverse mutation assay and in vivo-mammalian bone marrow chromosome aberration test.
- **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]

- **Propane-1,2-diol** : In reproductive/developmental toxicity study with mice, no test material-related adverse effects were observed(OECD TG 414, GLP).
- **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]

- **Propane-1,2-diol** : In acute oral toxicity study (doses: 15~25 mL/kg gw) with rats, hemorrhagic areas in the small intestine, microscopic changes in kidney and slight congestion of the liver were observed.
- **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]

- **Propane-1,2-diol** : In subchronic inhalation toxicity study with rats, nasal haemorrhagings were observed.
- **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 = 147.19059mg/l)
- Chronic toxicity : [Category 3]

Fish

- **Propane-1,2-diol** : 96hr-LC₅₀ (*Oncorhynchus mykiss*) = 40613 mg/L
- **Ethanol** : 96hr-LC₅₀ = 14200 mg/L

crustacean

- **Propane-1,2-diol** : 48hr-LC₅₀ (*Ceriodaphnia dubia*) = 18340 mg/L ,7d-NOEC(*Ceriodaphnia* sp) = 13020 mg/L
- **Ethanol** : 48hr-LC₅₀ = 5012 mg/L , 48hr-NOEC(*Daphnia magna*) = 9.6 mg/L
- **Nonionic surfactant** : 48hr-EC₅₀ > 100 mg/L (OECD TG 202)

Algae

- **Propane-1,2-diol** : 72hr-EC₅₀ (*Skeletonema costatum*) = 19300 mg/L (OECD TG 201, GLP)
- **Ethanol** : 96hr-LC₅₀ = 675 mg/L (OECD TG 201)
- **Nonionic surfactant** : 72hr-EC₅₀ > 100 mg/L (OECD TG 201)

B. Persistence and degradability

Persistence

- **Propane-1,2-diol** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -1.07) (EU Method A.8, GLP)
- **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)

C. Bioaccumulative potential

Bioaccumulation

- **Propane-1,2-diol** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 0.09)

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

Biodegradation

- **Propane-1,2-diol** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 106.8% biodegradation was observed after 28 days) (OECD TG 301F, GLP)

- **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

- **Propane-1,2-diol** : Low potency of mobility to soil. (Koc = 2.9)

- **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 Not applicable

B. UN Proper shipping name Not applicable

C. Transport Hazard class Not applicable

D. Packing group Not applicable

E. Marine pollutant Not applicable

F. Special precautions

in case of fire Not applicable

in case of leakage Not applicable

15. Regulatory information

A. Occupational Safety and Health Regulation Not regulated

B. Toxic Chemical Control Act

Water : Existing Chemical Substance (KE-35400)

Gellan gum : Existing Chemical Substance KE-17592

Propane-1,2-diol : Existing Chemical Substance (KE-29267)

Ethanol : Existing Chemical Substance (KE-13217)

Nonionic surfactant : Existing Chemical Substance (KE-05137)

Fragrance : Existing Chemical Substance ; CAS No. 101-86-0: KE-28401/CAS No. 1222-05-5: KE-18564/CAS No. 107-75-5: KE-20434/CAS No.60-12-8: KE-28354/CAS No. 1335-46-2: KE-24309/CAS No. 54464-57-2: KE-26601/CAS No. 31906-04-4: KE-20676/CAS No. 32388-55-9: KE-05-0697/ CAS No. 106-22-9: KE-11671/ CAS No. 77-54-3: KE-26603/ CAS No. 120-51-4: KE-02782/ CAS No. 115-95-7: KE-11622/ CAS No. 118-58-1: KE-02824/ CAS No. 105-87-3: KE-11608/ CAS No. 104-67-6: KE-18358

C. Dangerous Material Safety Management Regulation

Propane-1,2-diol : Dangerous Material Safety Management Regulation 4000L

Ethanol : Dangerous Material Safety Management Regulation 400ℓ

Fragrance : Dangerous Material Safety Management Regulation CAS No. 101-86-0; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 1222-05-5; Petroleum class 4-3 / CAS No. 107-75-5; 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. 1335-46-2; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 31906-04-4; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 106-22-9; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 77-54-3; Non-dangerous goods / CAS No. 120-51-4; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ / CAS No. 115-95-7; 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. 105-87-3; 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)

Water : Classification Not classified

Propane-1,2-diol : Classification Not classified

Ethanol : Classification F; R11

Nonionic surfactant : Classification Not classified

EU classification(risk phrases)

Water : Hazard statements Not applicable

Propane-1,2-diol : Hazard statements Not applicable

Ethanol : Hazard statements R11

Nonionic surfactant : Hazard statements Not applicable

EU classification(safety phrases)

Water : Precautionary statements Not applicable

Propane-1,2-diol : Precautionary statements Not applicable

Ethanol : Precautionary statements S2 S7 S16

Nonionic surfactant : 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

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

Gellan gum

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

China management information Inventory of Existing Chemical Substances (IECSC): Present 02973

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: HSR004027

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

Propane-1,2-diol

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

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

Canada management information Domestic Substances List (DSL): Present

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

Japan management information Existing and New Chemical Substances (ENCS) : (2)-234

Japan management information Industrial Safety and Health Law Substances (ISHL): 2-(8)-321,2-(8)-323

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

16. Other information**A. Information source and references**

Fragrance MSDS

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]

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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>

The Chemical Database -The Department of Chemistry at the University of Akron;

<http://ull.chemistry.uakron.edu/erd/> (Description) , (Solubility (ies))

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 EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>
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 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> (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) , (Auto ignition temperature) , (Viscosity) , (Molecular weight) , (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>
 Waste Control Act enforcement regulation attached [1]
 ECOTOX; <http://cfpub.epa.gov/ecotox/>
 Emergency Response Guidebook 2008;
http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf
 International Chemical Safety Cards(ICSC)(<http://www.hihs.go.jp/ICSC>)
 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>
 National Institute of Technology and Evaluation(NITE); <http://www.safe.nite.go.jp/english/db.html>
 TOMES; <http://www.rightanswerknowledge.com/loginRA.asp>
 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) Hazardous Substances Data Bank(HSDB);
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>
 UN Recommendations on the transport of dangerous goods 17th
 Waste Control Act enforcement regulation attached [1]
 Wet tissue Preservatives MSDS (Description) , (Color) , (Odor) , (pH) , (Solubility (ies)) , (Specific gravity) , (Oral) , (Dermal) , (Serious eye damage/ irritation) , (Carcinogenicity) , (Mutagenicity) , (Fish) , (Degradability)
 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)
 TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp>
 Waste Control Act enforcement regulation attached [1]
 CHARABOT MSDS
 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>
 UN Recommendations on the transport of dangerous goods 17th
 Waste Control Act enforcement regulation attached [1]

B. Issuing date 2013.10.29

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.