MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier ANTIFREEZE COOLANT SUPPLEMENTAL
B. Recommended use of the chemical and restrictions on use
Recommended use Antifreeze & Coolant for auto
Restrictions on use Use only as intended
C. Manufacturers
Company name BULLSONE
Address 7F, Dabong Tower, 418, Teheran-ro Gangnam-gu, Seoul, 135-839, Korea
Emergency phone number 82-2-2106-7777
Respondent Han Dong Jin
Fax 82-32-8749952

2. Hazards identification

A. GHS classification of the substance/mixture
Acute toxicity (oral) : Category 5
B. GHS label elements, including precautionary statements
Pictogram and symbol : Not applicable
Signal word : Warning
Hazard statements :
H303 May be harmful if swallowed.
Precautionary statements
Precaution : Not applicable
Treatment
P312 Call a poison center or doctor/physician if you feel unwell.
Storage : Not applicable
Disposal : Not applicable
C. Other hazard information not included in hazard classification (NFPA)
Health 1
Flammability 1
Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
ethyleneglycol	ethyleneglycol(CAS No. 107-21-1) +2-ethylhexanoic acid, sodium salt(CAS No. 19766-89-3) +disodium tetraborate pentahydrate; borax pentahydrate(CAS No.12179-04-3)			93 %
Rust inhibitor package	Water(CAS No. 7733-18-5) +Triethanol amine(CAS No. 102-71-6) +Phosphoric acid(CAS No. 7664-38-2)			6 %

	+Potassium phosphate(CAS No. 7558-11-04) +Benzotriazole(CAS No. 95-14-7) +Tolytriazole(CAS No. 29385-43-1) +Sodium hydroxide(CAS No. 1310-73-2)			
Water				1 %

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.
- For minor skin contact, avoid spreading material on unaffected skin.

C. Inhalation
- Move victim to fresh air.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Keep victim warm and quiet.

D. Ingestion
- Call emergency medical service.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

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
- Suitable extinguishing media: Dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO2
- Unsuitable extinguishing media: High pressure water streams

B. Specific hazards arising from the chemical
- May be ignited by heat, sparks or flames.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Fire will produce irritating and/or toxic gases.
- If inhaled, may be harmful.

C. Special protective equipment and precautions for fire-fighters
- 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; 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.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures
- 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.
- 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
- Absorb or cover with dry sand, earth or other non-combustible material and transfer to containers.

7. Handling and storage

A. Precautions for safe handling
- Please note that materials and conditions to avoid.
- Wash thoroughly after handling.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to high temperature.

B. Conditions for safe storage
- Store in a closed container.
- Store in cool and dry place.

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

ethyleneglycol CAS No. 107-21-1; STEL: 40 ppm (100 mg/m³)

Rust inhibitor package

(CAS No. 7664-38-2; TWA:1 mg/m³ STEL:3 mg/m³ / CAS No. 1310-73-2; C 0.1 mg/m³)

ACGIH regulation : Not available

Biological exposure index : Not available

OSHA regulation : Not available

NIOSH regulation : Not available

EU regulation : Not available

Other : Not available

B. Appropriate engineering controls
- Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

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 facepiece with goggles to protect.
- An eye wash unit and safety shower station should be available nearby work place.
- 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 chemical resistant gloves.
- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

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

9. Physical and chemical properties

A. Appearance
Description Liquid
Color Green
B. Odor Odorless
C. Odor threshold Not available
D. pH 8 ~ 9
E. Melting point/freezing point -13 ℃
F. Initial boiling point and boiling range 198 ℃
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 0.092 mmHg
L. Solubility (ies) Not available
M. Vapor density Not available
N. Specific gravity 1.108
O. Partition coefficient: n-octanol/water Not available
P. Auto ignition temperature Not available
Q. Decomposition temperature Not available
R. Viscosity 21 cP
S. Molecular weight 63g/mole

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions:
- Fire may produce irritating and/or toxic gases.
- If inhaled, may be harmful.

B. Conditions to avoid:
- Heat, sparks or flames

C. Incompatible materials:
- Combustibles

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

11. Toxicological information

A. Information of Health Hazardous:
Acute toxicity
Oral [Category 5] (ATEmix = 2,150.54 mg/kg bw)

- **ethyleneglycol** : Rat $LD_{50} \leq 2{,}000$ mg/kg (> 2,000 mg/kg), 1,2-Ethanediol(Oral), Adult:1.2 ~ 1.5 g/kg, Consciousness is damaged, kidney damage, central nervous system damage: This symptom / jindang / findings may due to the low dose

Dermal [Not classified]

- **ethyleneglycol** : Rabbit $LD_{50} > 2{,}000$ mg/kg

Inhalation [Not classified]

Skin corrosion/ irritation [Not classified]

- **ethyleneglycol** : In skin irritation test with rabbits, skin irritations were not observed.

Serious eye damage/ irritation [Not available]

- **ethyleneglycol** : In eye irritation test with rabbits, eye irritations were not observed

Respiratory sensitization [Not classified]

Skin sensitization [Not classified]

Carcinogenicity [Not classified]

KOREA-ISHL, IARC, NTP, OSHA, ACGIH, EU Regulation 1272/2008: not listed

Mutagenicity [Not classified]

Reproductive toxicity [Not classified]

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

- **ethyleneglycol** : In acute oral toxicity test with rats, acute toxic effects were not observed.

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

Aspiration Hazard [Not classified]

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Not available]
- Chronic toxicity : [Not available]

Fish

- **ethyleneglycol :** 96hr-LC_{50} (*Leuciscus idus*) > 100 mg/L

crustacean

- **ethyleneglycol :** 48hr-EC_{50} (*Daphnia magna*) > 100 mg/L

Algae

- **ethyleneglycol :** 72hr-EC_{50} > 100 mg/L Aquatic Plant

B. Persistence and degradability

Persistence Not available

Degradability

- **ethyleneglycol** : > 70% DOC reduction (OECD 301 A (new edition)) is readily biodegradable

C. Bioaccumulative potential

Bioaccumulation Not available

Biodegradation Not available

D. Mobility in soil Not available

E. Other hazardous effect

- **ethyleneglycol** : 1,2-Ethanediol : - Keep the MAK value, the development of the embryo or fetus is no risk of damage. - All information is available from the risk of skin resorption effects not shown for carcinogenicity.

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
ethyleneglycol : Administration subject listed : CAS No. 107-21-1
ethyleneglycol : Occupational exposure limits listed : CAS No. 107-21-1
ethyleneglycol : Work environment monitoring listed (6 months): CAS No. 107-21-1
ethyleneglycol : Health examination agent (12 months): CAS No. 107-21-1
Rust inhibitor package : Work environment monitoring listed (6 months) ; CAS No. 7664-38-2/CAS No. 1310-73-2
Rust inhibitor package : Administration subject listed ; CAS No. 7664-38-2/CAS No. 1310-73-2
Rust inhibitor package : Occupational exposure limits listed ; CAS No. 7664-38-2/CAS No. 1310-73-2
B. Toxic Chemical Control Act
ethyleneglycol : Existing Chemical Substance ;CAS No. 107-21-1: KE-13169
Rust inhibitor package : Existing Chemical Substance ; CAS No. 7732-18-5: KE-35400/CAS No. 102-71-6: KE-25940/CAS No. 7664-38-2: KE-27427/CAS No. 95-14-7: KE-02732/CAS No. 29385-43-1: KE-23495/CAS No. 1310-73-2: KE-31487
Rust inhibitor package : Toxic Chemicals ; CAS No. 1310-73-2: 97-1-136(5% or more in mixtures)
Water : Existing Chemical Substance (KE-35400)
C. Dangerous Material Safety Management Regulation
ethyleneglycol : Dangerous Material Safety Management Regulation CAS No. 107-21-1; Petroleum class 4-3 (water soluble liquid) 4000ℓ
Rust inhibitor package : Dangerous Material Safety Management Regulation CAS No. 102-71-6; Petroleum class 4-3 (water soluble liquid) 4000ℓ / CAS No. 7664-38-2; Non-dangerous goods / CAS No. 1310-73-2; Non-dangerous goods
D. Wastes Control Act
Rust inhibitor package : Wastes Control Act CAS No. 102-71-6; Controlled wastes/ CAS No. 7664-38-2; Controlled wastes/ CAS No. 1310-73-2; 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
EU classification(risk phrases)
Water : Hazard statements Not applicable
EU classification(safety phrases)
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

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

TOMES-LOLI®; http://www.rightanswerknowledge.com/loginRA.asp
BASF Korea MSDS (Description) , (Odor) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Flash point) , (Upper/lower flammability or explosive limits) , (Vapor pressure) , (Specific gravity) , (Auto ignition temperature) , (Viscosity) , (Oral) , (Dermal) , (Skin corrosion/ irritation) , (Serious eye damage/ irritation) , (Specific target organ toxicity (single exposure)) , (Fish) , (crustacean) , (Algae) , (Degradability) , (Other hazardous effect)
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
Waste Control Act enforcement regulation attached [1]
DAE KYUNG HI-TECH MSDS
Daekyung HI-TECH MSDS (Description) , (Color) , (Odor) , (pH) , (Melting point/freezing point) , (Initial boiling point and boiling range) , (Solubility (ies)) , (Specific gravity)
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
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 and date 06. Dec. 2013.

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.