

MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier FIRSTCLASS WHEEL CLEAN & SHINE

B. Recommended use of the chemical and restrictions on use

Recommended use Wheel cleaner & shine

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

Gases under pressure : Liquefied gas

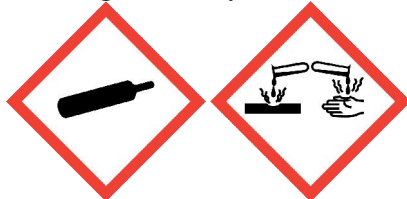
Skin corrosion/irritation : Category 1A-1C

Serious eye damage /eye irritation : Category 1

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

B. GHS label elements, including precautionary statements

Pictogram and symbol :



Signal word : Danger

Hazard statements :

H280 Contains gas under pressure; may explode if heated.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H402 Harmful to aquatic life.

Precautionary statements

Precaution

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P264 Wash skin thoroughly after handling.

P273 Avoid release to the environment.

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

Treatment

P301+P330+P331 If swallowed: Rinse mouth. Do not induce vomiting.

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

P304+P340 If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

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

P310 Immediately call a poison center or doctor/physician.

P363 Wash contaminated clothing before reuse.

Storage

P405 Store locked up.

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 3

Flammability 1

Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
Water				70~80 %
Sodium tripolyphosphate	Sodium tripolyphosphate	7758-29-4	231-838-7	1~ 3 %
Disodium metasilicate	Sodium metasilicate	6834-92-0	229-912-9	1~ 3 %
Sodium Benzoate	Benznatron	532-32-1	208-534-8	0.1~0.5 %
Dipropylene glycol methyl ether	Dipropylene glycol monomethyl ether	34590-94-8	252-104-2	1~ 5 %
TRIETHANOLAMINE				1~5 %
Poyethylene glycol lauryl ether	Poyethylene glycol lauryl ether	9002-92-0	500-002-6	0.1~0.3 %
Fragrance				0.01~0.1 %
Secret				1~ 5 %
Butane	Butan	106-97-8	203-448-7	5~10 %
Propane	Dimethylmethan	74-98-6	200-827-9	1~5 %

4. First aid measures**A. Eye contact**

- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- Call emergency medical service.

B. Skin contact

- If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- 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.
- For minor skin contact, avoid spreading material on unaffected skin.

C. Inhalation

- Immediately call a poison center or doctor/physician.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

D. Ingestion

- If swallowed: Rinse mouth. Do not induce vomiting.

- 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.
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- 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.
- Some of these materials, if spilled, may leave a flammable residue after evaporation

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.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Substance may be transported in a molten form.
- Ruptured cylinders may rocket.
- 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; 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.
- Fire involving Tanks; For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- 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

- 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

- 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

- Wash ... thoroughly after handling.
- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
- Use only in a well-ventilated area.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Use carefully in handling/storage.
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- Avoid breathing vapors from heated material.
- Do not enter storage area unless adequately ventilated.
- 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

- Store locked up.
- Protect from sunlight. Store in a well-ventilated place.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
- Containers can build up pressure if exposed to heat (fire).

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Dipropylene glycol methyl ether TWA = 100 ppm (600 mg/m³), STEL = 150 ppm (900 mg/m³)

ACGIH regulation

Dipropylene glycol methyl ether TWA 100 ppm STEL 150 ppm

TRIETHANOLAMINE TWA 5 mg/m³

Butane STEL 1000 ppm

Biological exposure index

Dipropylene glycol methyl ether

OSHA regulation

Dipropylene glycol methyl ether TWA= 100 ppm, STEL= 150 ppm

Butane TWA = 800 ppm, (1900 mg/m³)

Propane TWA=1000 ppm (1800 mg/m³)

NIOSH regulation

Dipropylene glycol methyl ether TWA= 100 ppm, STEL= 150 ppm

Butane TWA = 800 ppm, (1900 mg/m³)

Propane TWA=1000 ppm (1800 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)

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

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)

B. Appropriate engineering controls

- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
- Facilities for storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

C. Personal protective equipment

Respiratory protection

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

Eye protection

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

Hand protection

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

Body protection

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

9. Physical and chemical properties

A. Appearance

Description Liquid

Color Hazy

B. Odor

Orange

C. Odor threshold

Not available

D. pH

12 ~ 13

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

1.0

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.

- 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:

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

11. Toxicological information

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

Oral [Not classified] (ATEmix = 46,901.32 mg/kg bw)

- **Sodium tripolyphosphate** : Rat LD₅₀ > 2,000 mg/kg (OECD TG 401, GLP)
- **Disodium metasilicate** : Rat LD₅₀ = 661.5 ~ 896.3 mg/kg (female)
- **Sodium Benzoate** : Rat LD₅₀ = 2,100 mg/kg
- **Dipropylene glycol methyl ether** : Rat LD₅₀ > 5,000 mg/kg (OECD TG 401)
- **TRIETHANOLAMINE** : Rat LD₅₀ = 6,400 mg/kg (OECD TG 401)
- **Poyethylene glycol lauryl ether** : Rat LD₅₀ = 1,000 mg/kg (female)

Dermal [Not classified]

- **Sodium tripolyphosphate** : Rabbit LD₅₀ > 4,640 mg/kg
- **Disodium metasilicate** : Rat LD₅₀ > 5,000 mg/kg (EPA OPPTS 870.1200, GLP, read-across ; Potassium silicate solution)
- **Dipropylene glycol methyl ether** : Rat LD₅₀ > 20 mg/kg (단위 환산: 19,000 mg/kg) (OECD TG 402)
- **TRIETHANOLAMINE** : Rabbit LD₅₀ > 2,000 mg/kg (OECD TG 402)
- **Poyethylene glycol lauryl ether** : Rat LD₅₀ = 2,000 mg/kg (OECD TG 402)

Inhalation [Not classified] (ATEmix = 20,568.86 mg/L)

- **Sodium tripolyphosphate** : Rat LD₅₀ > 0.39 mg/L/4hr (EPA OPP 81-3, GLP)
- **Disodium metasilicate** : Rat LD₅₀ > 2.06 mg/L/4hr (EPA OPPTS 870.1300, GLP, read-across ; Potassium silicate solution)
- **Dipropylene glycol methyl ether** : Rat LC₅₀ > 275 ppm/4hr (단위 환산: 1.67 mg/L) (OECD TG 403)
- **Butane** : Rat LC₅₀ = 1,443 mg/L/15min
- **Propane** : Rat LC₅₀ = 280,000 mg/kg/10min

Skin corrosion/ irritation [Category 1A-1C]

- **Sodium tripolyphosphate** : In test on skin irritation with rabbits, skin irritations were not observed. (OECD TG 404, GLP)
- **Disodium metasilicate** : In test on skin irritation with rabbits, skin corrosion was observed.(OECD TG 404, GLP)
- **Sodium Benzoate** : In skin irritation test with rabbits, skin irritations were not observed.(OECD TG 404, GLP)
- **Dipropylene glycol methyl ether** : In test on skin irritation with rabbits, skin irritations were not observed. (OECD TG 404)
- **TRIETHANOLAMINE** : In test on skin irritation with rabbits, skin irritations were not observed.(OECD TG 404)
- **Poyethylene glycol lauryl ether** : By administration of Dodecan-1-ol,ethoxylated at dose concentration of 75 mg for 24 hrs showed mild irritation to skin of rabbits by Standard draize test.
- **silicone emulsion** : - Propylene glycol : Rabbit/OECD Guide-line 404: Not irritating to skin. Human/Skin(104 mg/2D): Mild irritation Male/Skin(10%/2D): Mild irritation Child/Skin(30%/96H): Mild irritation - Sorbitan, monododecanoate, poly(oxy-1,2-ethanediyl) derivs. : Irritating

Serious eye damage/ irritation [Category 1]

- **Sodium tripolyphosphate** : In test on eyes irritation with rabbits, eyes irritations were not observed. (OECD TG 405, GLP)
- **Disodium metasilicate** : In test on eye irritation with rabbits, eye corrosion was observed.(GLP)
- **Sodium Benzoate** : In eye irritation test with rabbits, eye irritations were observed.(Draize=7.7, cornea=0, iris=0, conjunctivae=2.7, chemosis=0.7)(female)(OECD TG 405, GLP)
- **Dipropylene glycol methyl ether** : Eyes irritations were not observed when exposed to human.
- **TRIETHANOLAMINE** : Recent animal studies indicate that TEA is only a 'slight' eye irritant and therefore this effect is not of concern.
- **Poyethylene glycol lauryl ether** : By the Standard draize test administration of Dodecan-1-ol,ethoxylated in the dose of 100 mg was reported to be irritating to eye of rabbit.
- **silicone emulsion** : - Siloxanes and Silicones, di-Me : Eye standard Draize Test Rabbit Amount: 100mg/1H; Mildly irritating - Propylene glycol : Human/Eye: Slightly irritating Rabbit/Eye(100 mg): Slightly irritating - Sorbitan, monododecanoate, poly(oxy-1,2-ethanediyl) derivs. : Irritating

Respiratory sensitization [Not classified]**Skin sensitization** [Not classified]

- **Sodium tripolyphosphate** : In test on skin sensitization with mice, skin sensitization were not observed.(OECD TG 429, GLP)
- **Disodium metasilicate** : In local lymph node assay using mice, skin sensitization was not observed.(OECD TG 429)
- **Dipropylene glycol methyl ether** : Skin sensitization were not observed when exposed to human.
- **TRIETHANOLAMINE** : In Guinea pig maximisation test under OECD TG 406, triethanolamine is not a skin sensitizer in animals.(GLP)
- **Poyethylene glycol lauryl ether** : Administartion of the test substance Dodecan-1-ol, ethoxylated for 24 hrs. in adult male guinea pigs when injected intracutaneously did not produced direct or delayed sensitization reactions.
- **silicone emulsion** : - Propylene glycol : Human/Draize Test: No sensitization.

Carcinogenicity [Not classified]**IARC**

- **TRIETHANOLAMINE** : Group 3

Sodium tripolyphosphate : No carcinogenic effects were observed in the oral study with rats. (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.

Mutagenicity [Not classified]

- **Sodium tripolyphosphate** : Negative reactions were observed in, in vitro (In vitro mammalian chromosome aberration test; Bacterial reverse mutation assay) and in vivo (Chromosome aberration assay, OECD TG 475).
- **Disodium metasilicate** : Negative reactions were observed in in vitro test(bacterial reverse mutation assay(OECD TG 471, GLP), mammalian cell gene mutation assay(OECD TG 476, GLP, read-across ; Sodium silicate solution), mammalian chromosome aberration test(OECD TG 473, GLP, read-across ; Sodium silicate solution)), and in vivo(chromosome aberration assay(OECD TG 475)).
- **Sodium Benzoate** : Positive reaction was observed in vitro(mammalian chromosome aberration test(OECD TG 473, GLP))/ Negative reactions were observed in vitro(bacterial reverse mutation assay(OECD TG 471, GLP)) and in vivo(Mutagenicity Screening Studies).
- **Dipropylene glycol methyl ether** : Negative reactions were observed in vitro(Bacterial gene mutation test(OECD TG 471, GLP) , Chromosomal aberrations test(OECD TG 473, GLP)).
- **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.
- **Poyethylene glycol lauryl ether** : Negative reactions were observed in vitro test(mammalian chromosome aberration test and bacterial reverse mutation assay).
- **silicone emulsion** : - Propylene glycol : In vitro - Salmonella typhimurium/TA 98, TA100, TA1535, TA1537 (Reverse mutation test; Ames test): Negative,Human/Sister chromatid exchange

test: Negative

- **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).

- **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).

Reproductive toxicity [Not classified]

- **Sodium tripolyphosphate** : In reproductive/developmental(OECD TG 414, GLP) toxicity test with rats, there were no significant effects.

- **Disodium metasilicate** : In reproductive oral toxicity study(read-across ; Sodium silicate) with rats, there were no significant adverse effects on reproductive parameters, and in developmental oral toxicity study with mice, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.

- **Sodium Benzoate** : In developmental toxicity screening test with rabbits, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEL \geq 250 mg/kg bw/day)(OECD TG 414).

- **Dipropylene glycol methyl ether** : In reproductive toxicity study with rats, decreased body weights, decreased fertility, decreased ovary weights, increased incidence of histologic ovarian atrophy were observed. (OECD TG 416, GLP)

- **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.

- **Poyethylene glycol lauryl ether** : Human(female) was treated by endoscopic intravascular injection sclerotherapy using polidocanol. No adverse effects were detected in the newborn.

- **silicone emulsion** : - Propylene glycol : In 10-day administration of 1230 mg/kg in pregnant rabbits, there were no effects in fertilization rate, and in fetal or maternal survival rate. For fetal developmental toxicity without maternal toxicity, skeletal system and malformation was the main indicator, and the observed levels were \geq 500 mg/kg/day in mice, and \geq 1,000 mg/kg/day in rabbits. Effects on fetal weight and survival rate were occurred at higher concentrations.

- **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/m³)(OECD TG 422, GLP)

- **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)

Specific target organ toxicity (single exposure) [null] [null]

- **Sodium tripolyphosphate** : In acute oral toxicity with rats, the only clinical signs noted were abdominal staining, decreased locomotion, and diarrhea; all signs had resolved within 24 hour post dosing.(OECD TG 401, GLP)

- **Disodium metasilicate** : In repeated inhalation toxicity test with rats, hunched posture and hypoactivity were observed.(EPA OPPTS 870.1300, GLP)

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

- **Dipropylene glycol methyl ether** : In acute inhalation toxicity with rats, adverse effects were not observed related to acute toxicity. (OECD TG 403)

- **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)

- **Poyethylene glycol lauryl ether** : No deaths or signs of toxicity were observed.(OECD TG 402)

- **silicone emulsion** : - Propylene glycol : Non-toxic symptoms are suppression of central nerves under anaesthesia. There is no specifically targeted organ.

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

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

- **Sodium tripolyphosphate** : In an oral repeated dose toxicity study(0.05%, 0.5% and 5%) with rats during 2 years, mortalities were high as a result of intercurrent epidemics of infections. The highest mortality (80%) over the 2 year period was observed in females in the 5% dose group. Respiratory infection and pericarditis-peritonitis were the most prominent causes of death.

- **Disodium metasilicate** : In repeated oral toxicity test with rats, no clear treatment related effects were observed.(OECD TG 408)
 - **Sodium Benzoate** : One high dose male died, after hypersensitivity and convulsions. No further clinical signs were reported. Mean body weights of male and female high dose animals were depressed and Changes in organ weights were noted in the mid and high dose groups.(NOAEL=18100 mg/kg)(OECD TG 407)
 - **Dipropylene glycol methyl ether** : In repeated oral toxicity study with rats for 13 weeks, no adverse effects were observed. (OECD TG 413, 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.
 - **Poyethylene glycol lauryl ether** : The average systolic blood pressure of rats medicated at the top dose level was not significantly different from that of the controls 2 hours after the last medication. No gross or microscopic pathologic lesions attributable to medication were noted at autopsy.
 - **silicone emulsion** : - Propylene glycol : 90-day exposure in rats, weight and food consumption decreased but clinical chemistry and haematological values were unchanged. No toxicological effects in organs (liver, kidney, pancreas, lung)and blood.
 - **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)
 - **Propane** : In repeated inhalation toxicity study with rats for 28 days, repeated toxicity related effects were not observed.(OECD TG 422, GLP)
- Aspiration Hazard** [Not classified]

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Category 3] (ATEmix = 26.75977mg/ℓ)
- Chronic toxicity : [Not classified]

Fish

- **Sodium tripolyphosphate** : 24hr-LC₅₀ (*Brachydanio rerio*) > 1850 mg/L (pH 8)
- **Disodium metasilicate** : 96hr-LC₅₀ = 210 mg/L (OECD TG 203)
- **Sodium Benzoate** : 96hr-LC₅₀ > 100 mg/L (pH 6.5 ~ 8.5)(OECD TG 203)
- **Dipropylene glycol methyl ether** : 96hr-LC₅₀ > 1000 mg/L (OECD TG 203, GLP)
- **TRIETHANOLAMINE** : 96hr-LC₅₀ = 1180 mg/L
- **Poyethylene glycol lauryl ether** : 96hr-LC₅₀ = 1.5 mg/L (*Salmo salar*)
- **Propane** : 96hr-LC₅₀ = 27.98 mg/L (Estimated)

crustacean

- **Sodium tripolyphosphate** : 48hr-EC₅₀ (*Daphnia magna*) > 100 mg/L (TSCA guideline: 40 CFR 797.1930, GLP)
- **Disodium metasilicate** : 48hr-EC₅₀ = 1700 mg/L (pH7.8-8)(OECD TG 202, part 1, GLP, read-across ; CAS No. 1344-09-8)
- **Sodium Benzoate** : 96hr-LC₅₀ > 100 mg/L (OECD TG 202)
- **Dipropylene glycol methyl ether** : 48hr-LC₅₀ = 1919 mg/L (OECD TG 202, GLP)
- **TRIETHANOLAMINE** : 24hr-LC₅₀ = 1386 mg/L
- **Poyethylene glycol lauryl ether** : 48hr-LC₅₀ = 4.780 ~ 7.580 mg/L
- **Propane** : 48hr-LC₅₀ = 14.22 mg/L (Estimated)

Algae

- **Sodium tripolyphosphate** : 96hr-EC₅₀ (*Scenedesmus subspicatus*) = 69.2 mg/L (surface under growth curve) (ISO/TC147/SC5/WG5 N84)
- **Disodium metasilicate** : 72hr-EC₅₀ = 207 mg/L (OECD TG 201, GLP, read-across ; CAS No. 1344-09-8)
- **Sodium Benzoate** : 72hr-EC₅₀ > 30.5 mg/L NOEC-72hr (*Pseudokirchnerella subcapitata*)=0.09 mg/L, (pH 8.0 ~ 8.5, 23.1 ~ 23.4 °C)(OECD TG 201, GLP)
- **Dipropylene glycol methyl ether** : 96hr-EC₅₀ > 969 mg/L (OECD TG 201, GLP)
- **TRIETHANOLAMINE** : 72hr-LC₅₀ = 216 mg/L
- **Propane** : 96hr-EC₅₀ = 7.71 mg/L (Estimated)

B. Persistence and degradability

Persistence

- **Sodium tripolyphosphate** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -13.26) (Estimated)
- **Sodium Benzoate** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -2.27)
- **Dipropylene glycol methyl ether** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 0.0043) (OECD TG 107, GLP)
- **TRIETHANOLAMINE** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -1.59)
- **Poyethylene glycol lauryl ether** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 1.937) (23 °C)
- **silicone emulsion** : Water : log Kow = -1.38/ Propylene glycol : log Kow = -1.4/ Sorbitan, monododecanoate, poly(oxy-1,2-ethanediyl) derivs. : log Kow = -2.03 (Estimates)
- **Propane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.8) (pH 7)(20 °C)

Degradability

- **Sodium tripolyphosphate** :
- **TRIETHANOLAMINE** : Half-life in air - 4 hours, Half-life in soil - 14 days, Half-life in water - 14 days

C. Bioaccumulative potential

Bioaccumulation

- **Sodium tripolyphosphate** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3.162) (Estimated)
- **Sodium Benzoate** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3.162)
- **Dipropylene glycol methyl ether** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF < 100)
- **TRIETHANOLAMINE** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3)
- **Poyethylene glycol lauryl ether** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 120) (estimated)
- **silicone emulsion** : Propylene glycol : BCF < 1/ Sorbitan, monododecanoate, poly(oxy-1,2-ethanediyl) derivs. : BCF = 3.16 (Estimates)

Biodegradation

- **Sodium Benzoate** : As well-biodegraded, it is expected to have low accumulation potential in living organisms ($\geq 74\%$ biodegradation was observed after 28 days) (OECD TG 301 B)
- **Dipropylene glycol methyl ether** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 96% biodegradation was observed after 28 days) (OECD TG 301F, GLP)
- **TRIETHANOLAMINE** : ready biodegradability (aerobic)
- **Poyethylene glycol lauryl ether** : This substance is ready biodegradability.
- **silicone emulsion** : Propylene glycol : Biodegradability > 60 (%) 10 day
- **Butane** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 100% biodegradation was observed after 385 hrs)
- **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

D. Mobility in soil

- **Sodium tripolyphosphate** : Low potency of mobility to soil. (Koc = 142.44)
- **Sodium Benzoate** : Low potency of mobility to soil. (Koc = 0.07945)
- **Dipropylene glycol methyl ether** : Low potency of mobility to soil. (Koc = 1.377) (estimated)
- **TRIETHANOLAMINE** : Low potency of mobility to soil. (Koc = 3)
- **Poyethylene glycol lauryl ether** : Low potency of mobility to soil. (Koc = 87.36)
- **silicone emulsion** : Sorbitan, monododecanoate, poly(oxy-1,2-ethanediyl) derivs. : Koc = 239700000 (Can be adsorbed in the soil, Estimates)

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
 - Butane : Occupational exposure limits listed
- B. Toxic Chemical Control Act
 - Water : Existing Chemical Substance (KE-35400)
 - Sodium tripolyphosphate : Existing Chemical Substance KE-34753
 - Disodium metasilicate : Existing Chemical Substance (KE-12354)
 - Sodium Benzoate : Existing Chemical Substance KE-02711
 - TRIETHANOLAMINE : Existing Chemical Substance KE-25940
 - Poyethylene glycol lauryl ether : Existing Chemical Substance (KE-12935)
 - Fragrance : Existing Chemical Substance ; CAS No. 78-70-6; KE-11592
 - silicone emulsion : Existing Chemical Substance ; CAS No. 63148-62-9; KE-31068/CAS No. 7732-18-5; KE-35400/CAS No. 57-55-6; KE-29267/CAS No. 9005-64-5; KE-31681
- C. Dangerous Material Safety Management Regulation
 - Sodium tripolyphosphate : Dangerous Material Safety Management Regulation
 - Sodium Benzoate : Dangerous Material Safety Management Regulation
 - Dipropylene glycol methyl ether : Dangerous Material Safety Management Regulation
 - TRIETHANOLAMINE : Dangerous Material Safety Management Regulation 4000 ℓ
 - Fragrance : Dangerous Material Safety Management Regulation CAS No. 78-70-6; Petroleum class 4-3 (non-water soluble liquid) 2000ℓ
 - silicone emulsion : Dangerous Material Safety Management Regulation
- D. Wastes Control Act
 - Disodium metasilicate : Wastes Control Act Controlled wastes
 - silicone emulsion : Wastes Control Act CAS No. 63148-62-9; 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
 - Disodium metasilicate : Classification C; R34 Xi; R37
 - Dipropylene glycol methyl ether : Classification Not classified
 - Poyethylene glycol lauryl ether : Classification Not classified
 - Butane : Classification F+; R12
 - Propane : Classification F+; R12
 - EU classification(risk phrases)
 - Water : Hazard statements Not applicable
 - Disodium metasilicate : Hazard statements R34 R37
 - Dipropylene glycol methyl ether : Hazard statements Not applicable

Poyethylene glycol lauryl ether : Hazard statements Not applicable

Butane : Hazard statements R12

Propane : Hazard statements R12

EU classification(safety phrases)

Water : Precautionary statements Not applicable

Disodium metasilicate : Precautionary statements S(1/2) S13 S24/25 S36/37/39 S45

Dipropylene glycol methyl ether : Precautionary statements Not applicable

Poyethylene glycol lauryl ether : Precautionary statements Not applicable

Butane : Precautionary statements S2, S9, S16

Propane : 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)

Sodium tripolyphosphate : CERCLA RQ 5000 lb

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

Sodium tripolyphosphate

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

Japan management information Existing and New Chemical Substances (ENCS): (1)-497

China management information Inventory of Existing Chemical Substances (IECSC): Present 29377

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: HSR003416

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

Disodium metasilicate

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

Japan management information Existing and New Chemical Substances (ENCS): (1)-508

China management information Inventory of Existing Chemical Substances (IECSC): Present 13833

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: HSR003511

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

Sodium Benzoate

U.S.A management information Section 8(b) Inventory (TSCA): Present
 Japan management information Existing and New Chemical Substances (ENCS): (3)-1293; (3)-1272; (3)-1076
 China management information Inventory of Existing Chemical Substances (IECSC): Present 02575
 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: HSR002716
 Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Dipropylene glycol methyl ether

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
 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 Code HSR001402
 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

Poyethylene glycol lauryl ether

U.S.A management information Section 8(b) Inventory (TSCA): XU
 Japan management information Existing and New Chemical Substances (ENCS): (7)-97
 China management information Inventory of Existing Chemical Substances (IECSC): Present30614
 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: HSR003168
 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

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

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>
 T. HASEGAWA CO. , LTD MSDS
 ECOTOX; <http://cfpub.epa.gov/ecotox/>
 National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>
 EPISUITE : <http://www.epa.gov/opt/exposure/pubs/episuitedl.htm>
 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>
 EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>
 KCC MSDS
 Emergency Response Guidebook 2008;
http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf
 U.S. National library of Medicine(NLM) Hazardous Substances Data Bank(HSDB);
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>
 U.S. National library of Medicine(NLM) ChemIDplus; <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CHEM>
 U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB) ;
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm>
 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>
 International Programme on Chemical Safety(IPCS) Concise International Chemical Assessment
 Documents (CICADs); <http://www.inchem.org/>
 U.S. National library of Medicine(NLM); <http://toxnet.nlm.nih.gov/cgi-bin/sis>
 TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp>
 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 2013.12.05.

C. Revision number and date

revision number 1

date of the latest revision 2014.06.13.

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.
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