

MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier MULTI PURPOSE LUBRICANT

B. Recommended use of the chemical and restrictions on use

Recommended use Lubricate and protect from moisture

Restrictions on use Use only as intended

C. Manufacturers

Company name Bullstone

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2. Hazards identification

A. GHS classification of the substance/mixture

Flammable liquids : Category 3

Gases under pressure : Liquefied gas

Acute toxicity (oral) : Category 4

Specific target organ toxicity (single exposure) : Category 3 (narcotic effects)

Aspiration hazard : Category 1

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

Hazardous to the aquatic environment (chronic) : Category 2

B. GHS label elements, including precautionary statements

Pictogram and symbol :



Signal word : Danger

Hazard statements :

H226 Flammable liquid and vapour

H280 Contains gas under pressure; may explode if heated.

H302 Harmful if swallowed.

H304 May be fatal if swallowed and enters airways.

H336 May cause drowsiness or dizziness.

H402 Harmful to aquatic life.

H411 Toxic to aquatic life with long lasting effects.

Precautionary statements

Precaution

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ventilating/lighting equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

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

P264 Wash ... thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

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

Treatment

P301+P310 If swallowed: Immediately call a poison center or doctor/physician.

P301+P312 If swallowed: Call a poison center or doctor/physician if you feel unwell.

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.

P312 Call a poison center or doctor/physician if you feel unwell.

P330 Rinse mouth.

P331 Do not induce vomiting.

P370+P378 In case of fire: Use ... for extinction.

P391 Collect spillage.

Storage

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P403+P235 Store in a well-ventilated place. Keep cool.

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 2

Flammability 1

Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
Sulfonic acids petroleum barium salts	Sulfonic acids petroleum barium salts	61790-48-5	263-140-3	3 %
Sulfurized vegetable fatty esters and hydrocarbons	Sulfurized Rape Oil(CAS No. 68153-37-7) +Sulfurized Vegetable Fatty Acid Esters(CAS# is a trade secret) +Sulfurized Rape Oil(CAS No. 68153-37-7)			1 %
Petroleum Hydrocarbon	Aceite de base sin especificar	64742-54-7	265-157-1	17 %
Distillates (petroleum), hydrotreated light	Hydrotreatedlight distillate (petroleum)	64742-47-8	265-149-8	47 %
Propane	Dimethylmethan	74-98-6	200-827-9	9 %
Butane	Butan Butano n-Butan xutane pure	106-97-8	203-448-7	23 %

4. First aid measures

A. Eye contact

- Call emergency medical service.
- Call emergency medical service.

- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

B. Skin contact

- If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- Call a poison center or doctor/physician if you feel unwell.
- Call a poison center or doctor/physician if you feel unwell.
- Call emergency medical service.
- Call emergency medical service.
- Remove and isolate contaminated clothing and shoes.
- Remove and isolate contaminated clothing and shoes.
- For minor skin contact, avoid spreading material on unaffected skin.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Wash skin with soap and water.
- Wash skin with soap and water.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.

C. Inhalation

- Do not induce vomiting.
- Do not induce vomiting.
- If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.
- If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.

D. Ingestion

- If swallowed: Immediately call a poison center or doctor/physician.
- If swallowed: Immediately call a poison center or doctor/physician.
- Rinse mouth.
- Rinse mouth.
- Do not induce vomiting.
- Do not induce vomiting.
- 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.
- 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.
- 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

- Flammable liquid and vapour

- Contains gas under pressure; may explode if heated.
- May violently polymerize and result in fire and explosion.
- Vapors may travel to a source of ignition and ignite.
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.
- 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.
- Many liquids are lighter than water.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas
- Substance may be transported hot.
- 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.
- 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; 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

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- The very fine particles may cause a fire or explosion, eliminate all ignition sources.
- The very fine particles may cause a fire or explosion, eliminate all ignition sources.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Do not direct water at spill or source of leak.
- Do not direct water at spill or source of leak.
- Eliminate all ignition sources.
- Eliminate all ignition sources.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.

- All equipment used when handling the product must be grounded.
- All equipment used when handling the product must be grounded.
- Allow substance to disperse
- Allow substance to disperse
- Ventilate the area.
- Ventilate the area.
- Stop leak if you can do it without risk.
- Stop leak if you can do it without risk.
- Some of these materials, if spilled, may leave a flammable residue after evaporation
- Some of these materials, if spilled, may leave a flammable residue after evaporation
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- A vapor suppressing foam may be used to reduce vapors.
- A vapor suppressing foam may be used to reduce vapors.
- Cover with plastic sheet to prevent spreading.
- Cover with plastic sheet to prevent spreading.
- Prevent dust cloud.
- Prevent dust cloud.
- Please note that there are materials and conditions to avoid.
- Please note that there are materials and conditions to avoid.

B. Environmental precautions and protective procedures

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

C. The methods of purification and removal

- Collect spillage.
- Collect spillage.
- Dike and collect water used to fight fire.
- Dike and collect water used to fight fire.
- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb 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.
- Absorb the liquid and scrub the area with detergent and water.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- Use clean non-sparking tools to collect absorbed material.
- Use clean non-sparking tools to collect absorbed material.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
- 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.
- 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.
- Small Spill; Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

7. Handling and storage

A. Precautions for safe handling

- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Avoid breathing dust/fume/gas/mist/vapours/spray.

- Wash ... thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Use carefully in handling/storage.
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- All equipment used when handling the product must be grounded.
- Please note that there are materials and conditions to avoid.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to high temperature.
- Be careful to heat.
- You need measurement of air concentration and ventilation in low, closed and confined areas due to lack of oxygen.

B. Conditions for safe storage

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Store in a well-ventilated place. Keep container tightly closed.
- Store in a well-ventilated place. Keep cool.
- 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).
- Keep away from food and drinking water.

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Petroleum Hydrocarbon TWA = 5 mg/m³ STEL = 10 mg/m³

ACGIH regulation

Sulfurized vegetable fatty esters and hydrocarbons TWA 10 mg/m³

Petroleum Hydrocarbon TWA 5 mg/m³ STEL 5 mg/m³

Butane STEL 1000 ppm

Biological exposure index : Not available

OSHA regulation

Sulfurized vegetable fatty esters and hydrocarbons Sulfurized Rape Oil: TWA:

5mg/m³ (Respirable Fraction), TWA: 15mg/m³ (Fume), Exposure limit for: Vegetable oil mists

Petroleum Hydrocarbon TWA = 5 mg/m³

Propane TWA=1000 ppm (1800 mg/m³)

Butane TWA = 800 ppm, (1900 mg/m³)

NIOSH regulation

Petroleum Hydrocarbon TWA = 5 mg/m³, STEL = 5 mg/m³

Propane TWA=1000 ppm (1800 mg/m³)

Butane TWA = 800 ppm, (1900 mg/m³)

EU regulation : Not available

Other

Distillates (petroleum), hydrotreated light Canada : TWA = 200 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)

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

B. Odor Solvent Oder

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 0.0824±0.004

O. Partition coefficient: n-octanol/water Not available

P. Auto ignition temperature Not available

Q. Decomposition temperature Not available

R. Viscosity (cst at 40 °C) 3.6±0.5 cP

S. Molecular weight Not available

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions:

- Flammable liquid and vapour
- Contains gas under pressure; may explode if heated.
- May violently polymerize and result in fire and explosion.
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.

- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.
- 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:

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

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
- Irritating and/or toxic gases

11. Toxicological information

A. Information of Health Hazardous:

Acute toxicity

Oral [Category 4] (ATEmix = 1,988.3 mg/kg bw)

- **Sulfonic acids petroleum barium salts** : Rat LD₅₀ > 16,000 mg/kg (Male)(GLP)
- **Sulfurized vegetable fatty esters and hydrocarbons** : Rat LD₅₀ ≥ 5,000 mg/kg
- **Petroleum Hydrocarbon** : Mouse LD₅₀ > 5,000 mg/kg
- **Distillates (petroleum), hydrotreated light** : Rat LD₅₀ > 5,000 mg/kg (OECD TG 420, GLP)

Dermal [Not classified]

- **Sulfonic acids petroleum barium salts** : Rabbit LD₅₀ > 4,000 mg/kg (GLP)
- **Petroleum Hydrocarbon** : Rabbit LD₅₀ > 5,000 mg/kg (Chronic – irritating, skin diseases)
- **Distillates (petroleum), hydrotreated light** : Rabbit LD₅₀ > 2,000 mg/kg (OECD TG 402, GLP)

Inhalation [Not classified] (ATEmix = 4,968.94 mg/L)

- **Sulfonic acids petroleum barium salts** : Rat LC₅₀ > 1.9 mg/L/4hr (GLP)
- **Sulfurized vegetable fatty esters and hydrocarbons** : Rat LD₅₀ = 1,365 mg/m³ (Male)
- **Distillates (petroleum), hydrotreated light** : Rat LC₅₀ > 5.28 mg/kg/4hr (OECD TG 403, GLP)
- **Propane** : Rat LC₅₀ = 280,000 mg/kg/10min
- **Butane** : Rat LC₅₀ = 1,443 mg/L/15min

Skin corrosion/ irritation [Not available]

- **Sulfonic acids petroleum barium salts** : In skin irritation test with rabbits, slightly skin irritations were observed.(erythema=0.7, edema=0)(GLP)
- **Sulfurized vegetable fatty esters and hydrocarbons** : In test on skin irritation with rabbits, skin irritations were not observed. (OECD TG 404)
- **Petroleum Hydrocarbon** : Slightly irritating in prolonged, repeated contact
- **Distillates (petroleum), hydrotreated light** : In test on skin irritation with rabbits, skin irritations were not observed.(erythema score=3.46,edema score=2.33)(GLP)

Serious eye damage/ irritation [Not available]

- **Sulfonic acids petroleum barium salts** : In eye irritation test with rabbits, eye irritations were not observed.(cornea=0, iris=0, conjunctivae=0.95, chemosis=0.33)(OECD TG 405, GLP)
- **Sulfurized vegetable fatty esters and hydrocarbons** : In test on eyes irritation with rabbits, eyes irritations were not observed. (OECD TG 405)
- **Petroleum Hydrocarbon** : Stimulus
- **Distillates (petroleum), hydrotreated light** : In test on eyes irritation with rabbits, eyes irritations were not observed. (GLP)

Respiratory sensitization [Not available]

Skin sensitization [Not classified]

- **Sulfonic acids petroleum barium salts** : In skin sensitisation test with mice, skin sensitization were observed.(male)(OECD TG 406, GLP)
- **Distillates (petroleum), hydrotreated light** : In skin sensitisation test with guinea pigs, skin sensitisation reactions were not observed.(male)(OECD TG 406, GLP)

Carcinogenicity [Not classified]

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

Petroleum Hydrocarbon : Highly refined mineral oil is classified to Category 3 by International Agency for Research on Cancer (IARC) (Findings in humans : data lacking, Findings in animals : data lacking)

Distillates (petroleum), hydrotreated light : In carcinogenicity test with mice, increased dermatitis and skin ulcers (250 and 500 mg/kg/day), and internal non-neoplastic lesions (500 mg/kg/day) were not observed but the result gave no evidence of a cancerogenic potential in mice.(OECD TG 451, GLP)

Mutagenicity [Not classified]

- **Sulfonic acids petroleum barium salts** : Negative reactions were observed with and without metabolic activation in vitro(bacterial reverse mutation assay(OECD TG 471, GLP), mammalian cell gene mutation assay(OECD TG 476, GLP)), in vivo (mammalian chromosome aberration test(OECD TG 474, GLP).
- **Distillates (petroleum), hydrotreated light** : Negative reactions were observed in vitro(mammalian cell gene mutation assay(OECD TG 476, GLP), bacterial reverse mutation assay(OECD TG 471), sister chromatid exchange assay in mammalian cells(OECD TG 479, GLP))and in vivo(mammalian bone marrow chromosome aberration test(OECD TG 475, GLP), rodent dominant lethal test(male)(OECD TG 478))
- **Propane** : Negative reactions were observed with and without metabolic activation in vitro(mammalian chromosome aberration test(OECD TG 473, GLP), bacterial reverse mutation assay(OECD TG 471, GLP).
- **Butane** : Negative reactions were observed with and without metabolic activation in vitro(mammalian chromosome aberration test(OECD TG 473, GLP), bacterial reverse mutation assay(OECD TG 471, GLP).

Reproductive toxicity [Not classified]

- **Sulfonic acids petroleum barium salts** : In reproduction/developmental toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.
- **Distillates (petroleum), hydrotreated light** : In reproduction(OECD TG 421)/developmental(OECD TG 414) toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.
- **Propane** : In reproduction/developmental toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEC = 9000 ppm)(OECD TG 422, GLP)
- **Butane** : In reproduction/developmental toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEC=21641 mg/m³)(OECD TG 422, GLP)

Specific target organ toxicity (single exposure) [구분 3 (마취작용)] [null]

- **Sulfonic acids petroleum barium salts** : In acute oral toxicity test with rats, acute toxic effects were not observed.(Male)(GLP)
- **Distillates (petroleum), hydrotreated light** : In acute inhalation toxicity test with rats, crusty eyes, decreased activity were observed but there were no significant adverse effects.(OECD TG 403, GLP)
- **Propane** : In acute inhalation toxicity test with rats, acute toxic effects were not observed.

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

- **Sulfonic acids petroleum barium salts** : In repeated oral toxicity study with rats for 28 days, repeated toxicity related effects were not observed.
- **Distillates (petroleum), hydrotreated light** : In repeated dose inhalation toxicity study with rats for 4 weeks, there were no significant adverse effects.(OECD TG 412, GLP)
- **Propane** : In repeated inhalation toxicity study with rats for 28 days, repeated toxicity related effects were not observed.(OECD TG 422, GLP)

- **Butane** : In repeated inhalation toxicity study with rats for 28 days, repeated toxicity related effects were not observed.(NOAEC = 9,000 ppm)(OECD TG 422, GLP)
- Aspiration Hazard** [Category 1]
- **Distillates (petroleum), hydrotreated light** : Viscosity : 1 ~ 2.4cSt (40 °C), Hydrocarbons

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Category 3] (ATEmix = 35.44015mg/ℓ)
- Chronic toxicity : [Category 2]

Fish

- **Sulfonic acids petroleum barium salts** : 96hr-LC₅₀ (other) = 1.2 mg/L (OECD TG 203, GLP)(22 ~ 23 °C)
- **Petroleum Hydrocarbon** : NOEC - 7d, > 5000 mg/ℓ
- **Distillates (petroleum), hydrotreated light** : 96hr-LC₅₀ > 10000 mg/L (GLP), 28d-NOEL(Oncorhynchus mykiss)=0.098 mg/L(estimated)
- **Propane** : 96hr-LC₅₀ = 27.98 mg/L (Estimated)

crustacean

- **Sulfonic acids petroleum barium salts** : 48hr-EC₅₀ (*Daphnia magna*) > 1000 mg/L (pH 7.2 ~ 8.1, 20.4 ~ 20.9 °C)(GLP)
- **Petroleum Hydrocarbon** : NOEC - 7d, 552 mg/ℓ
- **Distillates (petroleum), hydrotreated light** : 48hr-LC₅₀ = 11280 mg/L
- **Propane** : 48hr-LC₅₀ = 14.22 mg/L (Estimated)

Algae

- **Sulfonic acids petroleum barium salts** : 96hr-EC₅₀ (*Selenastrum capricornutum*) > 1000 mg/L (pH 7.5 ~ 9.8, 23.3 ~ 24 °C)(GLP), NOEC-72hr, (*Selenastrum capricornutum*) = 1000 mg/L (GLP)
- **Propane** : 96hr-EC₅₀ = 7.71 mg/L (Estimated)

B. Persistence and degradability

Persistence

- **Sulfonic acids petroleum barium salts** : High persistency (log Kow is more than 4 estimated.) (Log Kow = 41.08) (20 °C)
- **Distillates (petroleum), hydrotreated light** : High persistency (log Kow is more than 4 estimated.) (Log Kow = 6.23) (estimated)
- **Propane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.8) (pH 7)(20 °C)

Degradability

- **Petroleum Hydrocarbon** : Does not degrade immediately but has inherent biodegradability as in OECD Guidelines.

C. Bioaccumulative potential

Bioaccumulation

- **Sulfonic acids petroleum barium salts** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3.162) (Estimated)
- **Distillates (petroleum), hydrotreated light** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 207.7) (estimated)

Biodegradation

- **Sulfonic acids petroleum barium salts** : As not well-biodegraded, it is expected to have high accumulation potential in living organisms (= 8% biodegradation was observed after 28 days) (OECD TG 301 D, GLP)
- **Sulfurized vegetable fatty esters and hydrocarbons** : 61 %, 88 %,
 - **Distillates (petroleum), hydrotreated light** : As not well-biodegraded, it is expected to have high accumulation potential in living organisms (= 58.6% biodegradation was observed after 28 days) (OECD TG 301 F)
 - **Propane** : As not well-biodegraded, it is expected to have high accumulation potential in living organisms (= 50% biodegradation was observed after 2 days) (Q)SAR
 - **Butane** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 100% biodegradation was observed after 385 hrs)

D. Mobility in soil

- **Sulfonic acids petroleum barium salts** : Low potency of mobility to soil. (Koc = 24.45) (20 °C)
 - **Petroleum Hydrocarbon** : After floating for a while, oil components may move to the soil.
 - **Distillates (petroleum), hydrotreated light** : High potency of mobility to soil. (Koc = 196700)
- E. Other hazardous effect**
- **Sulfurized vegetable fatty esters and hydrocarbons** : Water Pollution Class WGK 1 - slightly hazardous to water (German Water Resources Act) - **Petroleum Hydrocarbon** : Prolonged exposure in water may affect aquatic organisms.

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 Yes

F. Special precautions

in case of fire F-D

in case of leakage S-U

15. Regulatory information

A. Occupational Safety and Health Regulation

Petroleum Hydrocarbon : Occupational exposure limits listed

Butane : Occupational exposure limits listed

B. Toxic Chemical Control Act

Sulfonic acids petroleum barium salts : Existing Chemical Substance KE-32512

Sulfurized vegetable fatty esters and hydrocarbons : Existing Chemical Substance ; CAS ;No. 68153-37-7; KE-30074

Petroleum Hydrocarbon : Existing Chemical Substance KE-12546

Distillates (petroleum), hydrotreated light : Existing Chemical Substance (KE-12550)

C. Dangerous Material Safety Management Regulation Not regulated

D. Wastes Control Act

Distillates (petroleum), hydrotreated light : Wastes Control Act Controlled wastes

E. Other regulation (internal and external)

Internal information

Persistent Organic Pollutants Acts Not regulated

External information

EU classification(classification)

Petroleum Hydrocarbon : Classification Carc. Cat. 2; R45

Distillates (petroleum), hydrotreated light : Classification Xn; R65

Propane : Classification F+; R12

Butane : Classification F+; R12

EU classification(risk phrases)

Petroleum Hydrocarbon : Hazard statements R45

Distillates (petroleum), hydrotreated light : Hazard statements R65

Propane : Hazard statements R12

Butane : Hazard statements R12

EU classification(safety phrases)**Petroleum Hydrocarbon** : Precautionary statements S53, S45**Distillates (petroleum), hydrotreated light** : Precautionary statements S2 S23 S24 S62**Propane** : Precautionary statements S2, S9, S16**Butane** : Precautionary statements S2, S9, S16**EU SVHC list** Not regulated**EU Authorisation List** Not regulated**EU Restriction list****Distillates (petroleum), hydrotreated light** : EU Restriction list Regulated**Propane** : EU Restriction list Regulated**U.S.A management information (OSHA Regulation)** Not regulated**U.S.A management information (CERCLA Regulation)** Not regulated**U.S.A management information (EPCRA 302 Regulation)** Not regulated**U.S.A management information (EPCRA 304 Regulation)** Not regulated**U.S.A management information (EPCRA 313 Regulation)** Not regulated**Substance of Roterdame Protocol** Not regulated**Substance of Stockholme Protocol** Not regulated**Substance of Montreal Protocol** Not regulated**Foreign Inventory Status****Sulfonic acids petroleum barium salts**

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

Japan management information Existing and New Chemical Substances (ENCS): (9)-1733

China management information Inventory of Existing Chemical Substances (IECSC): Present 31208

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 component in a product covered by a group standard but it is not approved for use as a chemical in its own right.

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

Sulfurized vegetable fatty esters and hydrocarbons

United States Federal Regulations(OSHA Hazeom Standard Rating) Non- Hazardous

United States Federal Regulations(OSHA Hazeom Standard Rating) Hazardous

United States Federal Regulations(RCRA Status) If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.(40 CFR 261.20-24)

☐☑(State Right-to-Know Information) Sulfurized Rape Oil(CAS No.68153-37-7): PA-H, NJ-N, MA-H(40%~70%)

☐☑(State Right-to-Know Information) Polyolefin Sulfide(CAS No. 68515-88-8): PA-N, NJ-N (10%~30%)

☐☑(State Right-to-Know Information) Sulfurized Vegetable Fatty Acid

Esters(NJT SRN:000001351): PA-H, NJ-N, MA-H (10%~30%)

☐☑(State Code Translation Table) PA-N = Pennsylvania Non-hazardous

☐☑(State Code Translation Table) PA-H = Pennsylvania Hazardous Substance List

☐☑(State Code Translation Table) NJ-N = New Jersey Other - includes predominant ingredients

☐☑(State Code Translation Table) MA-H = Massachusetts Hazardous Substance List

Distillates (petroleum), hydrotreated light

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

Japan management information Existing and New Chemical Substances (ENCS): (9)-1700

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

Canada management information Domestic Substances List (DSL): Present

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

New Zealand management information Inventory of Chemicals (NZIoC): May be used as a single component chemical under an appropriate group standard.

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

Propane

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

Japan management information Existing and New Chemical Substances (ENCS): (2)-3

China management information Inventory of Existing Chemical Substances (IECSC): Present 03571

Canada management information Domestic Substances List (DSL): Present

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

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001010

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

Butane

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

Japan management information Existing and New Chemical Substances (ENCS): (2)-4

China management information Inventory of Existing Chemical Substances (IECSC): Present 41372

Canada management information Domestic Substances List (DSL): Present

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

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR000989

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

16. Other information

A. Information source and references

REACH information on registered substances; <http://apps.echa.europa.eu/registered/registered-sub>
 Emergency Response Guidebook 2008;
http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf
 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>
 OECD SIDS; <http://webnet.oecd.org/hpv/ui/Search.aspx>
 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>
 National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>
 Kukdong oil & Chemicals Co, Ltd MSDS
 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
 American Conference of Governmental Industrial Hygienists TLVs and BEIs.
 NIOSH Pocket Guide; <http://www.cdc.gov/niosh/npg/npgdcas.html>
 RHEIN CHEMIE MSDS
 EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>
 REACH information on registered substances; <http://apps.echa.europa.eu/registered/registered-sub.aspx>
 eChemPortal- EnviChem ; <http://www.echemportal.org/echemportal/page.action?pageID=0>
 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 2014.06.20.

D. Others

- Revised Material Safety Data Sheet based on the amendments made on the Ministry of Employment and Labor Public Notice on Standard for Classification Labeling of Chemical Substance and Material Safety Data Sheet.
- This MSDS is authored in pursuant to the Article 41 of the Occupational Safety and Health Act.
- The content is based on the latest information and knowledge that we currently possess.
- This MSDS was authored to aid buyer, processor or any other third person who handles the chemical of subject in the MSDS; additionally, it does not warrant suitability of the chemical for special purposes or the commercial use of statements that approves the use of it in combination with other chemicals as well as technical or legal liabilities.
- The content of the MSDS may vary depending on the country or the region and may not coincide with the actual regulations. Therefore, the buyer or the processor of the chemical is responsible for observing responsible government's or the region's regulations.