MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier Sticker Tar cleaner
B. Recommended use of the chemical and restrictions on use
Recommended use Sticker Tar cleaner
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 82-2-2106-7911

2. Hazards identification

A. GHS classification of the substance/mixture
Flammable liquids : Category 2
Gases under pressure : Liquefied gas
Skin sensitization : Category 1
Reproductive toxicity : Category 2
Specific target organ toxicity (single exposure) : Category 3 (respiratory irritation)
Aspiration hazard : Category 2
Hazardous to the aquatic environment (acute hazard) : Category 1
Hazardous to the aquatic environment (chronic) : Category 2
B. GHS label elements, including precautionary statements
Pictogram and symbol :

Signal word : Danger
Hazard statements :
H225 Highly flammable liquid and vapour
H280 Contains gas under pressure; may explode if heated.
H305 May be harmful if swallowed and enters airways.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.
H400 Very toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.
Precautionary statements
Precaution
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
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.

P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.

Treatment

P301+P310 If swallowed: Immediately call a poison center or doctor/physician.
P302+P352 If on skin: Wash with plenty of soap and water.
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.
P308+P313 If exposed or concerned: Get medical advice/ attention.
P312 Call a poison center or doctor/physician if you feel unwell.
P331 Do not induce vomiting.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P363 Wash contaminated clothing before reuse.
P370+P378 In case of fire: Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material 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 (%)
Iso-hexane		107-83-5		20~30 %
4-isopropenyl-1-methylcyclohexene		5989-27-5	227-813-5	1~10 %
Naphtha (petroleum), hydrodesulfurized heavy	Naphtha petroleum hydrodesulfurized heavy	64742-82-1	265-185-4	20~35 %
Butane	Butan Butano n-Butan xutane pure	106-97-8	203-448-7	20~30 %
Propane	Dimethylmethan	74-98-6	200-827-9	10~20 %

4. First aid measures

A. Eye contact

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

B. Skin contact

- If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If skin irritation or rash occurs: Get medical advice/attention.
- Wash contaminated clothing before reuse.
- Call emergency medical service.
- Remove and isolate contaminated clothing and shoes.
- 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.
- Wash skin with soap and water.

C. Inhalation

- If exposed or concerned: Get medical advice/ attention.
- 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.

D. Ingestion

- If swallowed: Immediately call a poison center or doctor/physician.
- 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.

E. Indication of immediate medical attention and notes for physician

- Exposures require specialized first aid with contact and medical follow-up .
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. Fire fighting measures

A. Suitable (and unsuitable) extinguishing media

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.

B. Specific hazards arising from the chemical

- Highly flammable liquid and vapour
- Contains gas under pressure; may explode if heated.
- May decompose at high temperatures into forming toxic gases.
- May violently polymerize and result in fire and explosion.
- Vapors may travel to a source of ignition and ignite.
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.
- 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.
- The very fine particles may cause a fire or explosion, eliminate all ignition sources.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- All equipment used when handling the product must be grounded.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- A vapor suppressing foam may be used to reduce vapors.
- Cover with plastic sheet to prevent spreading.
- Prevent dust cloud.
- Please note that there are materials and conditions to avoid.

B. Environmental precautions and protective procedures

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

C. The methods of purification and removal

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

7. Handling and storage

A. Precautions for safe handling

- Do not handle until all safety precautions have been read and understood.
- 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.

- Use only outdoors or in a well-ventilated area.
- Contaminated work clothing should not be allowed out of the workplace.
- 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.
- 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).

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Isohexane CAS No. 287-92-3; TWA: 600 ppm (1720 mg/m³) / CAS No. 110-54-3; 50 ppm (180 mg/m³)

ACGIH regulation

Butane STEL 1000 ppm

Biological exposure index : Not available

OSHA regulation

Butane TWA = 800 ppm, (1900 mg/m³)

Propane TWA=1000 ppm (1800 mg/m³)

NIOSH regulation

Butane TWA = 800 ppm, (1900 mg/m³)

Propane TWA=1000 ppm (1800 mg/m³)

EU regulation : Not available

Other

D-Limonene Finland: TWA=25 ppm (140 mg/m³) STEL=50 ppm (280 mg/m³) Germany: TWA=5 ppm (28 mg.m³) Norway: TWA=25 ppm (140 mg/m³) STEL=37.5 ppm (175 mg/m³)

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.
- If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the recommended exposure limit.

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 Not available
B. Odor limonene
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 0.730
O. Partition coefficient: n-octanol/water Not available
P. Auto ignition temperature Not available
Q. Decomposition temperature Not available
R. Viscosity Not available
S. Molecular weight Not available

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions:

- Highly flammable liquid and vapour
- Contains gas under pressure; may explode if heated.
- May decompose at high temperatures into forming toxic gases.
- 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.

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:
- Corrosive and/or toxic fume
- Irritating and/or toxic gases
- Irritating, corrosive and/or toxic gases

11. Toxicological information

A. Information of Health Hazardous:

Acute toxicity

Oral [Not classified]

- **Isohexane** : Rat LD_{50} = mg/kg
- **D-Limonene** : Rat LD_{50} > 2,000 mg/kg (Female)(OECD TG 423, GLP)
- **Naphtha (petroleum), hydrodesulfurized heavy** : Rat LD_{50} > 5,000 mg/kg (OECD TG 401, GLP)

Dermal [Not classified]

- **D-Limonene** : Rabbit LD_{50} > 2 mg/kg
- **Naphtha (petroleum), hydrodesulfurized heavy** : Rabbit LD_{50} > 2,000 mg/kg (OECD TG 402, GLP)

Inhalation [Not classified] (ATEmix = 6,543.76 mg/L)

- **Isohexane** : Rat LD_{50} = mg/kg LC50 > 14.35 ㎎/ℓ 4hr Rat(as cyclo=Pentane) / LC50 77,000 ppm 1hr(as normal-Hexane)
- **Naphtha (petroleum), hydrodesulfurized heavy** : Rat LC_{50} > 5.16 mg/L/4hr (OECD TG 403, GLP)
- **Butane** : Rat LC_{50} = 1,443 mg/L/15min
- **Propane** : Rat LC_{50} = 280,000 mg/kg/10min

Skin corrosion/ irritation [Not available]

- **Isohexane** : - In skin irritation test with rabbits and human, observed skin irritation.
- **D-Limonene** : In skin irritation test with rabbits, skin irritations were not observed.(erythema =2, edema=1.33)(OECD TG 404, GLP)
- **Naphtha (petroleum), hydrodesulfurized heavy** : In skin irritation test with rabbits, skin irritations were observed.(OECD TG 404, GLP)

Serious eye damage/ irritation [Not available]

- **Isohexane** : - In eye irritation test with rabbits and human, observed eye irritation.
- **D-Limonene** : In eye irritation test with rabbits, eye irritations were not observed.(cornea=0, iris=0, conjunctivae=0.3, chemosis=1)
- **Naphtha (petroleum), hydrodesulfurized heavy** : In test on eyes irritation with rabbits, eyes irritations were net observed.(OECD TG 405, GLP)

Respiratory sensitization [Not available]

Skin sensitization [Category 1]

- **D-Limonene** : In skin sensitisation test with mice, skin sensitization were observed.(Female)(OECD TG 429, GLP)
- **Naphtha (petroleum), hydrodesulfurized heavy** : In sensitisation test with guinea pigs, skin sensitisation were not observed.(OECD TG 406, GLP)

Carcinogenicity [Not classified]

IARC

- D-Limonene : Group 3

EU

- Naphtha (petroleum), hydrodesulfurized heavy : Carc. 1B

D-Limonene : Under the test conditions, there was clear evidence of carcinogenic activity for male F344/N rats, as shown by increased incidences of tubular cell hyperplasia, adenomas, and adenocarcinomas of the kidney. There was no evidence of carcinogenic activity for female F344/N rats.(OECD TG 451, GLP)

Naphtha (petroleum), hydrodesulfurized heavy : In a carcinogenicity with mouse, unleaded gasoline is not expected to display carcinogenic properties.(OECD TG 451)

Mutagenicity [Not classified]

- **D-Limonene** : Negative reactions were observed with and without metabolic activation in vitro(mammalian chromosome aberration test(OECD TG 473), sister chromatid exchange assay in mammalian cells(OECD TG 479), mammalian cell gene mutation assay(OECD TG 476)).
- **Naphtha (petroleum), hydrodesulfurized heavy** : Negative reactions were observed in vitro test(Bacterial gene mutation assay and mammalian cell gene mutation assay)and in vivo test(Erythrocyte Micronucleus Assay(GLP) and Mammalian Bone Marrow Chromosome Aberration Test(OECD TG 475)).
- **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 [Category 2]

- **Naphtha (petroleum), hydrodesulfurized heavy** : In developmental inhalation toxicity study with rats, unleaded gasoline vapors did not produce evidence of developmental toxicity.(OECD TG 414, 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)
- **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] [구분 3 (호흡기계 자극)]

- **D-Limonene** : In acute oral toxicity test with rats, acute toxic effects were not observed.(Female)(OECD TG 423, GLP)
- **Naphtha (petroleum), hydrodesulfurized heavy** : In acute inhalation toxicity study with rats, There were no remarkable clinical signs noted during the course of treatment and no mortality.(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]

- **D-Limonene** : In repeated oral toxicity study with mice, repeated toxicity related effects were not observed.(OECD TG 408, GLP)
- **Naphtha (petroleum), hydrodesulfurized heavy** : In repeated dose inhalation toxicity study with rat and mouse, No compound-related changes were seen in mortality, hematology or clinical chemistry parameters in either species.(OECD TG 453)
- **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 [Category 2]

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Category 1] (ATEmix = 3.34970mg/ℓ)
- Chronic toxicity : [Category 2]

Fish

- **Isohexane :** 96hr-LC_{50} = 4656 mg/L
- **D-Limonene :** 96hr-LC_{50} = 0.720 mg/L (OECD TG 203, GLP)
- **Naphtha (petroleum), hydrodesulfurized heavy :** 96hr-LC_{50} = 2.5 mg/L
- **Propane :** 96hr-LC_{50} = 27.98 mg/L (Estimated)

crustacean

- **Isohexane :** 48hr-LC_{50} = 5424 mg/L
- **D-Limonene :** 24hr-EC_{50} = 0.85 mg/L (20 ~ 21 ℃)(OECD TG 202, GLP), NOEC-16d, (Daphnia magna or Daphnia pulex)=0.115 mg/L
- **Naphtha (petroleum), hydrodesulfurized heavy :** 96hr-LC_{50} = 4.3 mg/L
- **Propane :** 48hr-LC_{50} = 14.22 mg/L (Estimated)

Algae

- **Isohexane :** 96hr-EC_{50} = 3635 mg/L
- **D-Limonene :** 72hr-EC_{50} = 150 mg/L (OECD TG 201, GLP), readacross; CAS No. 8028-48-6, NOEC-72hr, (Desmodesmus subspicatus)=2.62 mg/L
- **Propane :** 96hr-EC_{50} = 7.71 mg/L (Estimated)

B. Persistence and degradability

Persistence

- **Isohexane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 3.21)
- **D-Limonene** : High persistency (log Kow is more than 4 estimated.) (Log Kow = 4.38)
- **Naphtha (petroleum), hydrodesulfurized heavy** : High persistency (log Kow is more than 4 estimated.) (Log Kow =2.1 ~ 6)
- **Propane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.8) (pH 7)(20 ℃)

Degradability Not available

C. Bioaccumulative potential

Bioaccumulation

- **Isohexane** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 100 ~ 408)
- **D-Limonene** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 360.5) (Estimated)
- **Naphtha (petroleum), hydrodesulfurized heavy** : Bioaccumulation is expected to be high according to the BCF ≥ 500 (BCF = 10 ~ 2500)

Biodegradation

- **D-Limonene** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 80% biodegradation was observed after 28 days)
- **Naphtha (petroleum), hydrodesulfurized heavy** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 77.05% biodegradation was observed after 28 days) (OECD TG 301F, GLP)
- **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

- **D-Limonene** : High potency of mobility to soil. (Koc = 6324)
- **Naphtha (petroleum), hydrodesulfurized heavy** : High potency of mobility to soil. (Koc = 80030) (estimated)

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 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
Isohexane : Occupational exposure limits listed
Isohexane : Authorization subject listed CAS No. 110-54-3
Isohexane : Administration subject listed CAS No. 110-54-3
Isohexane : Work environment monitoring listed CAS No. 110-54-3; (6 months)
Isohexane : Health examination agent CAS No. 110-54-3; (12 months)
Butane : Occupational exposure limits listed
B. Toxic Chemical Control Act
Isohexane : Existing Chemical Substance CAS No. 287-92-3; KE-09297/ CAS No. 107-83-5; KE-24699/ CAS No. 110-54-3; KE-18626
D-Limonene : Existing Chemical Substance KE-24397
Naphtha (petroleum), hydrodesulfurized heavy : Existing Chemical Substance (KE-25620)
C. Dangerous Material Safety Management Regulation
Isohexane : Dangerous Material Safety Management Regulation CAS No. 287-92-3; Petroleum class 4-1 (non-water soluble liquid) 200ℓ / CAS No. 107-83-5; Petroleum class 4-1 (non-water soluble liquid) 200ℓ / CAS No. 110-54-3; Petroleum class 4-1 (non-water soluble liquid) 200ℓ
D. Wastes Control Act Not regulated
E. Other regulation (internal and external)
Internal information
Persistant Organic Pollutants Acts Not regulated
External information
EU classification(classification)
D-Limonene : Classification R10, Xi;38, R43, N;R50-53
Naphtha (petroleum), hydrodesulfurized heavy : Classification Carc. Cat. 2; R45 Muta. Cat. 2; R46 Xn; R65
Butane : Classification F+; R12
Propane : Classification F+; R12
EU classification(risk phrases)
D-Limonene : Hazard statements R10, R38, R43, R50/53
Naphtha (petroleum), hydrodesulfurized heavy : Hazard statements R45 R46 R65
Butane : Hazard statements R12
Propane : Hazard statements R12
EU classification(safety phrases)
D-Limonene : Precautionary statements S2, S24, S37, S60, S61
Naphtha (petroleum), hydrodesulfurized heavy : Precautionary statements S53 S45
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
Naphtha (petroleum), hydrodesulfurized heavy : 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

D-Limonene

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (3)-2245; (3)-2226
China management information Inventory of Existing Chemical Substances (IECSC): Present 19147
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: HSR002725
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Naphtha (petroleum), hydrodesulfurized heavy

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (9)-1698
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

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

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
Dongsung Highchem MSDS
National Chemicals Information System; http://ncis.nier.go.kr/ncis/
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
SAMSUNG Total Co., Ltd. MSDS
NIOSH Pocket Guide; http://www.cdc.gov/niosh/npg/npgdcas.html
American Conference of Governmental Industrial Hygienists TLVs and BEIs.
REACH information on registered substances; http://apps.echa.europa.eu/registered/registered-sub.aspx
EU CLP; http://esis.jrc.ec.europa.eu/index.php?PGM=cla
International Uniform Chemical Information Database(IUCLID); http://esis.jrc.ec.europa.eu/
UN Recommendations on the transport of dangerous goods 17th

B. Issuing date 2013.08.30.

C. Revision number and date

revision number 1
date of the latest revision 2014.07.15.

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.