

MATERIAL SAFETY DATA SHEET

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

A. GHS product identifier AIR INTAKE SYSTEM CLEANER

B. Recommended use of the chemical and restrictions on use

Recommended use Intake valve cleaner

Restrictions on use Not available

C. Manufacturers

Company name Bullson Co.,Ltd

Address 890-12 Dabong Tower, Daechi-dong, Gangnam-gu, Seoul, Korea

Emergency phone number 822-2106-7777

Respondent Han Dongjin

Fax 822-2106-7911

2. Hazards identification

A. GHS classification of the substance/mixture

Flammable liquids : Category 2

Gases under pressure : Liquefied gas

Reproductive toxicity : Category 2

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

Specific target organ toxicity (repeated exposure) : Category 2

Aspiration hazard : Category 1

Hazardous to the aquatic environment (acute hazard) : Category 2

Hazardous to the aquatic environment (chronic) : Category 3

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.

H304 May be fatal if swallowed and enters airways.

H336 May cause drowsiness or dizziness.

H361 Suspected of damaging fertility or the unborn child.

H373 May cause damage to organs through prolonged or repeated exposure.

H401 Toxic to aquatic life.

H412 Harmful 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.

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

- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 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.
 P281 Use personal protective equipment as required.

Treatment

- P301+P310 If swallowed: Immediately call a poison center or doctor/physician.
 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.
 P314 Get medical advice/attention if you feel unwell.
 P331 Do not induce vomiting.

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 (%)
Toluene	Methylbenzene	108-88-3	203-625-9	> 30 %
cyclohexane		110-82-7		< 10 %
Acetone	Acetone	67-64-1	200-662-2	< 5 %
Xylene	Octadecanoic acid, sodium salt Sodium octadecanoate	822-16-2	212-490-5	< 30 %
Propane	Dimethylmethan	74-98-6	200-827-9	< 25 %

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

- 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.
- 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.
- 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

- Toluene TWA = 50 ppm (188 mg/m³)
- cyclohexane TWA = 300 ppm (1050 mg/m³)
- Acetone TWA = 500 ppm (1,188 mg/m³)

ACGIH regulation

- Toluene TWA 50 ppm
- cyclohexane TWA 100 ppm
- Acetone TWA 500 STEL 750
- Xylene TWA 10 mg/m³ (Stearates)

Biological exposure index

- Toluene Toluene in blood; 0.02 mg/L(prior to last shift of workweek), Toluene in urine; 0.03 mg/L(end of shift)
- Acetone 50 mg/l

OSHA regulation

- Toluene TWA = 100 ppm (375 mg/m³), STEL = 150 ppm (560 mg/m³)
- cyclohexane TWA : 300 ppm
- Acetone TWA=1,000 ppm
- Propane TWA=1000 ppm (1800 mg/m³)

NIOSH regulation

- Toluene TWA = 100 ppm (375 mg/m³), STEL = 150 ppm (560 mg/m³)
- cyclohexane TWA : 300 ppm (10 hr)
- Acetone TWA=250 ppm
- Propane TWA=1000 ppm (1800 mg/m³)

EU regulation

- Toluene TWA = 50 ppm, STEL = 100 ppm

Other

- Toluene Czech Republic: TWA = 200 mg/m³ France: TWA = 50 ppm, STEL = 100 ppm Italy: TWA = 50 ppm, STEL = 75 ppm Turkey: TWA = 50 ppm, STEL = 100 ppm U.K: TWA = 50 ppm, STEL = 100 ppm
- cyclohexane
- Acetone Belgium: TWA=500 ppm U.K: TWA=500 ppm Turkey: TWA=1,000 ppm
- 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.

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 Clear liquid

B. Odor Solvents odor

C. Odor threshold Not available

D. pH Not available

E. Melting point/freezing point Not available

F. Initial boiling point and boiling range Not available

G. Flash point Not available

H. Evaporation rate Not available

I. Flammability (solid, gas) Not applicable

J. Upper/lower flammability or explosive limits Not available

K. Vapor pressure Not available

L. Solubility (ies) Not available

M. Vapor density Not available

N. Specific gravity 0.840

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] (ATEmix = 6,922.31 mg/kg bw)

- **Toluene** : Rat LD₅₀ = 5,580 mg/kg (male)
- **cyclohexane** : Rat LD₅₀ > 5,000 mg/kg
- **Acetone** : Rat LD₅₀ = 5,800 mg/kg (female)

Dermal [Not classified] (ATEmix = 247,533.33 mg/kg bw)

- **Toluene** : Rabbit LD₅₀ > 5,000 mg/kg
- **cyclohexane** : Rabbit LD₅₀ > 2,000 mg/kg
- **Acetone** : Rabbit LD₅₀ = 15,800 mg/kg

Inhalation [Not classified] (ATEmix = 42.81 mg/L)

- **Toluene** : Rat LC₅₀ = 25.7 mg/L/4hr (OECD TG 403)
- **cyclohexane** : Rat LD₅₀ = mg/kg
- **Acetone** : Rat LC₅₀ = 76 mg/L/4hr
- **Propane** : Rat LC₅₀ = 280,000 mg/kg/10min

Skin corrosion/ irritation [Not available]

- **Toluene** : In test on skin irritation with rabbits, moderate skin irritations were observed. (GLP)
- **cyclohexane** : May be irritating to the skin. Continued contact with the skin may become dry or cracked.
- **Acetone** : In skin irritation test with rabbits, this substance was not irritating.

Serious eye damage/ irritation [Not available]

- **Toluene** : In test on skin irritation with rabbits, toluene is slightly irritating to the rabbit eye but it is not classified. (OECD TG 405, GLP)
- **cyclohexane** : May be irritating to eyes.
- **Acetone** : In test on eyes irritation with rabbits, severe eyes irritations were observed.
- **Xylene** : Experimental application of pure granulated white soap to rabbit eyes causes a moderately severe reaction, graded 8 on a scale of 1 to 10 after 24hr. Similarly 5% soln of soap causes transient mild conjunctival hyperemia & optical irregularity of the corneal epithelium if the exposure is brief.

Respiratory sensitization [Not classified]

- **cyclohexane** : Irritation, nausea, vomiting, headache, drowsiness, dizziness, loss adjustment, coma

Skin sensitization [Not classified]

- **Toluene** : In maximisation test on skin sensitization with guinea pig, skin sensitization was not observed. (GLP)
- **Acetone** : No indications of a sensitizing potential of acetone were found in a guinea pig maximization test.

Carcinogenicity [Not classified]

IARC

- **Toluene** : Group 3

ACGIH

- **Toluene** : A4
- **Acetone** : A4
- **Xylene** : A4 (Stearates)

Mutagenicity [Not classified]

- **Toluene** : Negative reactions were observed in both In vitro(Mammalian cell gene mutation assay, Bacterial reverse mutation assay) and In vivo(Chromosomal aberrations test).
- **Acetone** : Negative reactions were observed in both in vitro(chromosome aberration test (OECD TG 473), bacterial reverse mutation assay (OECD TG 471), mammalian cell gene mutation assay (OECD TG 476)) and in vivo(micronucleus assay).
- **Propane** : Negative reactions were observed with and without metabolic activation in

in vitro(mammalian chromosome aberration test(OECD TG 473, GLP), bacterial reverse mutation assay(OECD TG 471, GLP).

Reproductive toxicity [Category 2]

- **Toluene** : Toluene induced clinical signs in pregnant dams included ataxia, hyper-responsivity, increased water intake, decreased food consumption and lower body weight.
- **cyclohexane** : Weight loss of the fetus in animals, See the effect of the male reproductive organs(ACGIH, 2002)
- **Acetone** : In reproductive/developmental toxicity test with mice, increased liver weights of maternal and reduction of foetal weights were observed. (OECD TG 414)
- **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) [구분 3 (마취작용)] [null]

- **Toluene** : Toluene has low acute toxicity. In humans experimentally exposed to toluene, concentrations of 75 ppm (281 mg/m³) and above caused headache, dizziness, and feeling of intoxication, irritation and sleepiness.
- **cyclohexane** : May be irritating to the respiratory system
- **Acetone** : In acute oral toxicity study with rats, effects such as ataxia, hypnosis narcosis and CNS depression were observed.
- **Propane** : In acute inhalation toxicity test with rats, acute toxic effects were not observed.

Specific target organ toxicity (repeat exposure) [Category 2]

- **Toluene** : Repeated exposure to toluene via inhalation has been shown to affect the central nervous system and the inner ear. Long-term high-level exposure to toluene (abuse) via inhalation has caused serious damage to the brain including severe neurological abnormalities and brain atrophy.
- **Acetone** : In repeated oral toxicity study with rats for 13 weeks, mild toxics were observed on testis, kidneys and hematopoietic system. (OECD TG 408)
- **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 1]

- **Toluene** : Based on the fact that toluene is a hydrocarbon and has a dynamic viscosity of 0.65 mm²/s (25 °C).
- **cyclohexane** : Inhalation may cause chemical pneumonitis.

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Category 2] (ATEmix = 4.45667mg/ℓ)
- Chronic toxicity : [Category 3]

Fish

- **Toluene** : 96hr-LC₅₀ (*Oncorhynchus kistutch*) = 5.5 mg/L
- **cyclohexane** : 96hr-LC₅₀ = 4530 mg/L
- **Acetone** : 96hr-LC₅₀ = 6210 mg/L (OECD TG 203)
- **Xylene** : 96hr-LC₅₀ > 100 mg/L
- **Propane** : 96hr-LC₅₀ = 27.98 mg/L (Estimated)

crustacean

- **Toluene** : 48hr-EC₅₀ (*Ceriodaphnia dubia*) = 3.78 mg/L
- **cyclohexane** : 48hr-EC₅₀ = 0.9 mg/L
- **Acetone** : 48hr-LC₅₀ = 8880 mg/L
- **Xylene** : 48hr-EC₅₀ = 19 mg/L
- **Propane** : 48hr-LC₅₀ = 14.22 mg/L (Estimated)

Algae

- **Toluene** : 72hr-EC₅₀ (*Chlorella vulgaris*) = 134 mg/L
- **cyclohexane** : 48hr-LC₅₀ > 160000 mg/L
- **Xylene** : 72hr-EC₅₀ = 150 mg/L , 72hr-NOEC = 31 mg/L
- **Propane** : 96hr-EC₅₀ = 7.71 mg/L (Estimated)

B. Persistence and degradability**Persistence**

- **Toluene** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.73)
- **Acetone** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = -0.23)
- **Xylene** : High persistency (log Kow is more than 4 estimated.) (Log Kow = 4.13)
- **Propane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.8) (pH 7)(20 °C)

Degradability Not available**C. Bioaccumulative potential****Bioaccumulation**

- **Toluene** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 90)
- **cyclohexane** : Low bioaccumulation.
- **Acetone** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 3) (experimental)
- **Xylene** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 10)

Biodegradation

- **Toluene** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 86% biodegradation was observed after 20 days)
- **Acetone** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 90.9% biodegradation was observed after 28 days) (OECD TG 301B)
- **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

- **Toluene** : Low potency of mobility to soil. (Koc = 34 ~ 120)
- **cyclohexane** : No mobility in soil is absorbed
- **Acetone** : Low potency of mobility to soil. (Koc = 1) (estimated)
- **Xylene** : Low potency of mobility to soil. (Koc = 275.5)

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 Not applicable****E. Marine pollutant Not applicable****F. Special precautions**

in case of fire F-D

in case of leakage S-U

15. Regulatory information**A. Occupational Safety and Health Regulation**

Toluene : Health examination agent (12 months)

Toluene : Work environment monitoring listed (6 months)

Toluene : Administration subject listed

Toluene : Occupational exposure limits listed

cyclohexane : Administration subject listed

- cyclohexane : Work environment monitoring listed
- cyclohexane : Occupational exposure limits listed
- Acetone : Administration subject listed
- Acetone : Work environment monitoring listed
- Acetone : Health examination agent
- B. Toxic Chemical Control Act**
 - Toluene : Accident Precaution Chemicals
 - Toluene : Toxic Chemicals (97-1-298)
 - Toluene : Existing Chemical Substance (KE-33936)
 - Xylene : Existing Chemical Substance (KE-26415)
- C. Dangerous Material Safety Management Regulation**
 - Toluene : Dangerous Material Safety Management Regulation 200f
 - cyclohexane : Dangerous Material Safety Management Regulation
 - Acetone : Dangerous Material Safety Management Regulation 400f
 - Xylene : Dangerous Material Safety Management Regulation
- D. Wastes Control Act**
 - Toluene : Wastes Control Act Controlled wastes
- E. Other regulation (internal and external)**
 - Internal information**
 - Persistent Organic Pollutants Acts Not regulated
 - External information**
 - EU classification(classification)**
 - Toluene : Classification F; R11, Repr.Cat.3; R63, Xn; R48/20-65, Xi; R38, R67
 - cyclohexane : Classification F; R11-Xn; R65-Xi; R38 - R67 -N; R50-53
 - Acetone : Classification F; R11Xi; R36R66R67
 - Xylene : Classification Not classified
 - Propane : Classification F+; R12
 - EU classification(risk phrases)**
 - Toluene : Hazard statements R11, R38, R48/20, R63, R65, R67
 - cyclohexane : Hazard statements R11, R38, R65, R67, R50/53
 - Acetone : Hazard statements R11 R36 R66 R67
 - Xylene : Hazard statements Not applicable
 - Propane : Hazard statements R12
 - EU classification(safety phrases)**
 - Toluene : Precautionary statements S2, S36/37, S46, S62
 - cyclohexane : Precautionary statements S2, S9, S16, S25, S33, S60, S61, S62
 - Acetone : Precautionary statements S2 S9 S16 S26 S46
 - Xylene : Precautionary statements Not applicable
 - Propane : Precautionary statements S2, S9, S16
 - EU SVHC list Not regulated
 - EU Authorisation List Not regulated
 - EU Restriction list**
 - Toluene : EU Restriction list Regulated
 - Acetone : 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)**
 - Toluene : CERCLA RQ 1000 lb
 - Acetone : 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)**
 - Toluene : EPCRA 313 Regulated
 - Substance of Roterdame Protocol Not regulated
 - Substance of Stockholme Protocol Not regulated
 - Substance of Montreal Protocol Not regulated
 - Foreign Inventory Status**
 - Toluene**
 - U.S.A management information Section 8(b) Inventory (TSCA): present

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
 Japan management information Existing and New Chemical Substances (ENCS): (3)-2
 New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval:
 HSR001227
 Philippines management information Inventory of Chemicals and Chemical Substances
 (PICCS): present

cyclohexane

U.S.A management information Section 8(b) Inventory (TSCA): Present
 Japan management information Existing and New Chemical Substances (ENCS): (3)-2233
 China management information Inventory of Existing Chemical Substances (IECSC): Present
 14658
 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:
 HSR001111
 Philippines management information Inventory of Chemicals and Chemical Substances
 (PICCS): Present

Acetone

U.S.A management information Section 8(b) Inventory (TSCA): present
 Japan management information Existing and New Chemical Substances (ENCS): (2)-542
 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): present
 Philippines management information Inventory of Chemicals and Chemical Substances
 (PICCS) : 존재함

Xylene

Japan management information Existing and New Chemical Substances (ENCS): 2-611
 Canada management information Domestic Substances List (DSL): Present
 U.S.A management information Section 8(b) Inventory (TSCA): Present
 New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval
 Code HSR003189
 Philippines management information Inventory of Chemicals and Chemical Substances
 (PICCS): Present
 Australia management information Inventory of Chemical Substances (AICS): 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

U.S. National library of Medicine(NLM) Hazardous Substances Data Bank(HSDB);
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>
 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>

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>
 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>
 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>
 National Chemicals Information System; <http://ncis.nier.go.kr/ncis/TOMES-LOLI@>; <http://www.rightanswerknowledge.com/loginRA.asp>
 European Union Risk Assessment Report (RAR); [http://esis.jrc.ec.europa.eu/Waste Control Act enforcement regulation attached \[1\]](http://esis.jrc.ec.europa.eu/Waste%20Control%20Act%20enforcement%20regulation%20attached%20%5B1%5D)
 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>
 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>
 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>
 EU CLP; <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>
 SK energy MSDS
 UN Recommendations on the transport of dangerous goods 17th
 International Uniform Chemical Information Database(IUCLID); <http://esis.jrc.ec.europa.eu/>

B. Issuing date 2013.11.21.

C. Revision number and date

revision number 1

date of the latest revision 2014.6.5.

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.