

SDS(Safety Data Sheet)

Product	Gasoline		
MSDS Number	List No.	Issuing date	Last revised date
-	PD1037	2008-07-25	2024-01-16

1. IDENTIFICATION

1) Product name

Gasoline

2) Recommended use of the chemical and restriction on use

- Recommended use Fuels and additives
- Restrictions on use Do not use for any other purpose.

3) Details of the supplier of the safety data sheet

○ Manufacturer

- Company name GS Caltex Corporation
- Address GS Tower, 508, Nonhyeon-ro, Gangnam-gu, Seoul, Korea
- Emergency telephone number 1544-5151

2. HAZARDS IDENTIFICATION

1) Classification of the product

- FLAMMABLE LIQUIDS : Category 1
- SKIN CORROSION/IRRITATION : Category 2
- CARCINOGENICITY : Category 1A
- GERM CELL MUTAGENICITY : Category 1B
- TOXIC TO REPRODUCTION : Category 2
- SPECIFIC TARGET ORGAN TOXICITY FOLLOWING REPEATED EXPOSURE : Category 2
- ASPIRATION HAZARD : Category 1
- LONG-TERM HAZARDS TO THE AQUATIC ENVIRONMENT : Category 3

2) Label elements

○ Hazard pictograms



○ Signal word

Danger

○ Hazard statements

- H224 Extremely flammable liquid and vapour.
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H340 May cause genetic defects.(inhalation)

- H350 May cause cancer.(inhalation)
- H361 Suspected of damaging fertility or the unborn child.(fertility,Suspected of damaging the unborn child) (inhalation)
- H373 May cause damage to organs through prolonged or repeated exposure. (inhalation)
- H412 Harmful to aquatic life with long lasting effects.

○ **Precautionary statements**

1) Prevention

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.
- P241 Use explosion-proof [electrical/ventilating/lighting] equipment.
- P242 Use non-sparking tools.
- P243 Take precautionary measures against static discharge.
- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P264 Wash ... thoroughly after handling.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

2) Response

- P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P302 + P352 IF ON SKIN: Wash with plenty of water/cleansing agent.
- P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P308 + P313 IF exposed or concerned: Get medical advice/attention.
- P314 Get medical advice/attention if you feel unwell.
- P321 Specific treatment (see section 5).
- P331 Do not induce vomiting.
- P332 + P313 If skin irritation occurs: Get medical advice/attention.
- P362 + P364 Take off contaminated clothing and wash it before reuse.
- P370 + P378 In case of fire: Use manufacturer/supplier or the competent authority to specify appropriate media for extinction.

3) Storage

- P403 + P235 Store in a well-ventilated place. Keep cool.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container to

3) Other hazards

○ **Product NFPA Level**

(※ 0-Lack, 1-Low, 2-Moderate, 3-High, 4-Very High)

Product name	Health	Flammable	Reaction
Gasoline	2	4	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
Gasoline		86290-81-5	289-220-8	100
* 다음의 물질이 포함되어 있음				
Toluene	1-Methylbenzene; Methacide ; Methylbenzol	108-88-3	203-625-9	0 ~ 10
Xylene	Methyltoluene;Xylol	1330-20-7	215-535-7	0 ~ 10
Pentane	Normal pentane ; N-Pentane ;Amyl hydride	109-66-0	203-692-4	0 ~ 10
2-Methylpentane	1,1-Dimethylbutane ; Isohexane ;Pentane, 2-methyl-	107-83-5	203-523-4	0 ~ 2
Ethylbenzene	Ethyl benzene ; Ethylbenzol ; Phenylethane	100-41-4	202-849-4	0 ~ 2
n-Heptane	Heptyl hydride ;Dipropyl methane	142-82-5	205-563-8	0 ~ 1
n-Hexane	Hexyl hydride ; n-Hexane;Dipropyl	110-54-3	203-777-6	0 ~ 1
Benzene	1,3,5-Cyclohexatriene ; Benzine ; Benzole	71-43-2	200-753-7	0 ~ 0.7
Hexahydrobenzene	Cyclohexane; Hexahydrobenzene ; Hexamethylene	110-82-7	203-806-2	0 ~ 0.2

4. FIRST AID MEASURES

- 1) Eye contact**
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes.
 - If eye irritation persists: Get medical advice/attention.
- 2) Skin contact**
- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.
 - In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
 - If skin irritation occurs: Get medical advice/attention.
 - Take off immediately all contaminated clothing and wash it before reuse.
- 3) Inhalation**
- Do not use mouth-to-mouth method if victim 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.
 - Administer oxygen if breathing is difficult.
 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
 - IF exposed or concerned: Get medical advice/attention.
 - Do not induce vomiting.
- 4) Ingestion**
- Do not use mouth-to-mouth method if victim ingested the substance; give artificial

respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

5) Indication of any immediate medical attention and special treatment needed

- 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

1) 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.
- High-pressure water (Unsuitable extinguishing media)
- Direct water (Unsuitable extinguishing media)

2) Special hazards arising from the substance or mixture - Can form explosive mixtures at temperatures at or above the flashpoint.
- Fire may produce irritating, corrosive and/or toxic gases.
- Extremely flammable liquid and vapour.
- Heating may cause a fire or explosion.

3) Special protective equipment and precautions for firefighters - Rescuers should put on appropriate protective gear.
- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
- Eliminate all ignition sources if safe to do so.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment - Clean up spills immediately, observing precautions in Protective Equipment section.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Please note that materials and conditions to be avoided.

2) Environmental precautions - Large spill: Prevent entry into waterways, sewers, basements or confined areas.
- Avoid release to the environment.

3) Methods and material for containment and cleaning up - Dike and collect water used to fight fire.
- Absorb spill 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.
- Cover powder spill with plastic sheet or tarp to minimize spreading and keep

powder dry.

7. HANDLING AND STORAGE

1) Precautions for safe handling

- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Avoid prolonged or repeated contact with skin.
- Avoid breathing vapors from heated material.
- All equipment used when handling the product must be grounded.
- Please note that materials and conditions to be avoided.
- Handling refer to engineering control/personal protection section.
- Wash thoroughly after handling.
- Use only outdoors or in a well-ventilated area.

2) Conditions for safe storage (including any incompatibilities)

- Please note that materials and conditions to be avoided.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Store in a well-ventilated place. Keep container tightly closed.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Control parameters

Chemical name	Exposure limits	ACGIH TLV	OSHA PEL	Biological limit values(BLV)
Gasoline	Not available	Not available	Not available	Not available
Toluene	TWA : 50 ppm STEL : 150 ppm	Not available	PEL: 200 ppm, C 300 ppm mg/m ³	0.02 mg/L Medium: blood Time: prior to last shift of workweek Parameter: Toluene; 0.03 mg/L Medium: urine Time: end of shift Parameter: Toluene; 0.3 mg/g creatinine Medium: urine Time: end of shift Parameter: o-Cresol with hydrolysis (background)

Xylene	TWA : 100 ppm STEL : 150 ppm	Not available	PEL: 100 ppm	1.5 g/g creatinine Medium: urine Time: end of shift Parameter: Methylhippuric acids
Pentane	TWA : 600 ppm STEL : 750 ppm	Not available	PEL: 1000 ppm	Not available
2-Methylpentane	TWA : 500 ppm STEL : 1,000 ppm	Not available	Not available	Not available
Ethylbenzene	TWA : 100 ppm STEL : 125 ppm	Not available	PEL: 100 ppm	0.15 g/g creatinine Medium: urine Time: end of shift Parameter: Sum of mandelic acid and phenylglyoxylic acid (nonspecific)
n-Heptane	TWA : 400 ppm STEL : 500 ppm	Not available	PEL: 500 ppm	Not available
n-Hexane	TWA : 50 ppm	Not available	PEL: 500 ppm	0.5 mg/L Medium: urine Time: end of shift Parameter: 2,5-Hexanedione without hydrolysis
Benzene	TWA : 0.5 ppm STEL : 2.5 ppm	Not available	Not available	25 µg/g creatinine Medium: urine Time: end of shift Parameter: S-Phenylmercapturic acid (background); 500 µg/g creatinine Medium: urine Time: end of shift Parameter: t,t-Muconic acid (background)
Hexahydrobenzene	TWA : 200 ppm	Not available	PEL: 300 ppm	Not available

2) Appropriate engineering controls

- Install local exhaust ventilation system.
- Check legal suitability of exposure level.

3) Personal protection equipment

- **Respiratory protection**
 - If exposure concentration of the material is lower than 100 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposed particulate material ; such
 - If exposure concentration of the particle material is lower than 250 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposed particulate material
 - If exposure concentration of the particle material is lower than 500 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposed particulate materia
 - If exposure concentration of the particle material is lower than 10000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposed particulate mater
 - If exposure concentration of the material is lower than 100000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposed particulate material ; su
 - If exposure concentration of the material exceeds the permitted exposure standards, Wear European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment.
- **Eye protection**
 - An eye wash unit and safety shower station should be available nearby work place.
 - Wear breathable safety goggles to protect from vapour state organic material causing eye irritation or other disorder.
- **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

Item	Input Value
Apperance	Liquid
Color	No Data
Smell	가솔린냄새
Smell Threshold	No Data
pH (Numerical value)	No Data

Melting/Freezing Point	-90.5~95.4 °C
Boiling Point	32 ~ 210 °C
Flash Point	-43 °C
Evaporating Rate	No Data
Flammability(Solid, Gas)	No Data
Explosibility Range	LEL : 1.2%, UEL : 7.6%
Steam Pressure	304~684 mmHg (at 37.8°C)
Solubility	No Data
Vapor Density	3~4 (공기=1)
Specific Gravity	0.7~0.8
Distribution Coefficient	2.1~6
Selfignition Temperature	280~456
Pyrolysis Temperature	No Data
Viscosity	0.5 mm ² /s (at 40°C)
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

- 1) Chemical Stability and hazardous reactivity** - Can form explosive mixtures at temperatures at or above the flashpoint.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Fire may produce irritating, corrosive and/or toxic gases.
- 2) Conditions to avoid** - Ignition source(heat, spark, flame, friction, shock, contamination)
- 3) Incompatible materials** - Combustibles
- 4) Hazardous decomposition products** - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

11. TOXICOLOGICAL INFORMATION

1) Information on the likely routes of exposures

- **Inhalation**
 - No inhalation effects through respiratory system.
- **Skin contact**
 - Causes skin irritation.
 - Absorbable through the skin
- **Eye contact**
 - Causes serious eye irritation.
 - Possible exposure through the eye

○ Ingestion

- May be fatal if swallowed and enters airways.
- Absorbable through the inhalation

2) Health hazard information

○ Acute toxicity

* Oral - Not classified (ATEmix > 2000 mg/kg)

- Gasoline : rat; no deaths; LD50 > 5000 mg/kg (read-across: Premium unleaded gasoline) (OECD TG 401, GLP) (ECHA)
- Toluene : rat(male); LD50 = 5580 mg/kg bw (EU Method B.1) (ECHA)
- Xylene : LD50(rat, male)=3,523 mg/kg bw (mixed isomers: 60.2% m-xylene, 13.6% p-xylene, 9.1% o-xylene, and 17.0% ethylbenzene) (EU Method B.1) (ECHA)
- Pentane : rat(male/female); LD50 > 2000 mg/kg, no deaths (OECD TG 401, GLP) (ECHA)
- 2-Methylpentane : rat; LD50 = 15840 mg/kg bw (read across : n-Hexane) (ECHA)
- Ethylbenzene : rat(male/female); LD50 = ca. 3500 mg/kg (ECHA)
- n-Heptane : rat; LD50 > 5000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)
- n-Hexane : Rat(Female/Male); LD50 = 15864 mg/kg bw (OECD TG 401)(ECHA)
- Benzene : Rat(Male); LD50 > 2000 mg/kg (OECD TG 401)(ECHA)
- Hexahydrobenzene : rat; LD50 > 5000 mg/kg bw, no deaths (OECD TG 401) (ECHA)

* Dermal - Not classified (ATEmix > 2000 mg/kg)

- Gasoline : rabbit; no deaths; LD50 > 2000 mg/kg (read-across: Premium unleaded gasoline) (OECD TG 402, GLP) (ECHA)
- Toluene : rabbit(male); LD50 > 5000 mg/kg bw (ECHA)
- Xylene : rabbit(male); LD50 = 12126 mg/kg (read across: m-xylene) (ECHA)
- Pentane : Not available
- 2-Methylpentane : Not available
- Ethylbenzene : rabbit(male); LD50 = ca. 15433 mg/kg (ECHA)
- n-Heptane : rabbit; LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
- n-Hexane : Rabbit(Female/Male); LD50 > 2000 mg/kg; No deaths (ECHA)
- Benzene : Rabbit(Male); LD50 > 9400 mg/kg (OECD TG 402)(ECHA)
- Hexahydrobenzene : rabbit; LD50 > 2000 mg/kg bw, no deaths (OECD TG 402) (ECHA)

* Inhalation(Gas) - Not applicable

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

* Inhalation(Vapour) - Not classified (ATEmix > 20 mg/L)

- Gasoline : rat; inhalation: vapour; LC50 > 7.63 mg/L (OECD TG 403, GLP) (ECHA)
- Toluene : rat; inhalation: vapours; LC50 = 28.1 mg/L air/4h (OECD TG 403) (ECHA)
- Xylene : 4h-LC50(rat)=4,550 ppm(unit conversion: 4h-LC50(rat)=19.71 mg/L (HSDB)

- Pentane : rat(male/female); inhalation: vapour; LC50 > 25.3 mg/L air /4h, no deaths (OECD TG 403, GLP) (read across: cyclopentane) (ECHA)
- 2-Methylpentane : Not available
- Ethylbenzene : rat(male); inhalation: vapour; LC50 = 17.8 mg/L air /4h (ECHA)
- n-Heptane : rat; inhalation: vapour; LC50 > 29.29 mg/L air/4h, no deaths (OECD TG 403) (ECHA)
- n-Hexane : Rat(Male); inhalation: Vapours, LC50 = 259 mg/L 4h (OECD TG 403) (ECHA)
- Benzene : Rat(Male); inhalation: Vapours, LC50 = 43.767 mg/L 4h (OECD TG 403)(ECHA)
- Hexahydrobenzene : rat; inhalation: vapour; LC50 > 32.880 mg/L air/4h, no deaths (OECD TG 403) (ECHA)

*** Inhalation(Dust, mist) - Not classified (ATEmix > 5 mg/L)**

- Gasoline : Not available
- Toluene : Not available
- Xylene : Not available
- Pentane : Not available
- 2-Methylpentane : Not available
- Ethylbenzene : Not available
- n-Heptane : Not available
- n-Hexane : Not available
- Benzene : Not available
- Hexahydrobenzene : Not available

○ Skin corrosion/Irritation : Category 2 (SKIN IRRITATION Cat.2)

- Gasoline : rabbit; irritating (OECD TG 404, GLP) (ECHA)
- Toluene : rabbit; irritating (EU Method B.4, GLP) (ECHA)
- Xylene : The skin corrosion potential was determined by exposing the intact skin of six rabbits to p-xylene for four hours. The sites of application were not destroyed or changed irreversibly during or after the exposure. CHEVRON PARAXYLENE 99% was considered not to be corrosive to the intact skin of rabbits. primary dermal irritation index (PDII) : 3 (EU Method B.4) (ECHA)
- Pentane : rabbit; not irritating (OECD TG 404) (ECHA)
- 2-Methylpentane : human; irritating (ECHA)
- Ethylbenzene : rabbit; moderately irritating (ECHA)
- n-Heptane : rabbit; irritating (OECD TG 404, GLP) (ECHA)
- n-Hexane : Rabbit ; Irritating (OECD TG 404)(ECHA)
- Benzene : Rabbit; Irritating (OECD TG 404)(ECHA)
- Hexahydrobenzene : rabbit; not irritating (EU Method B.4) (ECHA)

○ Serious eye damage/irritation : Not classified

- Gasoline : rabbit; not irritating (OECD TG 405, GLP) (ECHA)
- Toluene : rabbit; slightly irritating (OECD TG 405, GLP) (ECHA)
- Xylene : The available data indicate that mixed xylene and the individual isomers (m-, o- and p-xylene) should be considered to be irritating to skin, eyes and the respiratory tract. : induces serious eye irritation. (ECHA)
- Pentane : rabbit; not irritating (OECD TG 405, GLP) (ECHA)
- 2-Methylpentane : human; not irritating (ECHA)
- Ethylbenzene : rabbit; non irritating (conjunctivae score = 0) (ECHA)

- n-Heptane : rabbit; not irritating (OECD TG 405, GLP) (read across : Isooctane) (ECHA)
- n-Hexane : rabbit; not irritating (OECD TG 405) (ECHA)
- Benzene : Rabbit; irritating (ECHA)
- Hexahydrobenzene : rabbit; slightly irritating (OECD TG 405) (ECHA)

○ **Respiratory sensitization : Not classified**

- Gasoline : Not available
- Toluene : Not available
- Xylene : Not available
- Pentane : Not available
- 2-Methylpentane : Not available
- Ethylbenzene : Not available
- n-Heptane : Not available
- n-Hexane : Not available
- Benzene : Not available
- Hexahydrobenzene : Not available

○ **Skin sensitization : Not classified**

- Gasoline : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- Toluene : guinea pig; not sensitising (EU Method B.6, GLP) (ECHA)
- Xylene : mouse; not sensitising (OECD TG 429, GLP) (ECHA)
- Pentane : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)
- 2-Methylpentane : guinea pig; not sensitising (OECD TG 406) (ECHA)
- Ethylbenzene : Not available
- n-Heptane : guinea pig; not sensitising (OECD TG 406) (ECHA)
- n-Hexane : Mouse; not sensitizing (OECD TG 429)(ECHA)
- Benzene : Guinea pig; not sensitizing (OECD TG 406)(ECHA)
- Hexahydrobenzene : guinea pig; not sensitising (EU Method B.6, GLP) (ECHA)

○ **Carcinogenicity : Category 1A**

- Gasoline : EU CLP 1272/2008 : Carc. 1B (Note P : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene(EINECS No 200-753-7).
- Toluene : IARC : 3 (Not Classifiable)
ACGIH : A4 (Not Classifiable as a Human Carcinogen)
Inhalation studies in rats and mice (Huff, 1990; Gibson and Hardisty 1983) and a supporting study in mice using skin application (Broddle et al, 1996), are considered relevant for the risk assessment. Inhalation exposures for 6 or 6.5 h/day, 5 days/week for up to 2 years at concentrations up to 1200 ppm (4522 mg/m³) were used. The dermal application study involved application of 50 µL toluene twice a week for up to 2 years. No statistically significant increase in any tumour type was seen in any study. (ECHA)
- Xylene : The key chronic study was conducted by NTP (1986). The study comprises the oral gavage administration of mixed xylenes(60.2% m-xylene, 13.6% p-xylene, 9.1% o-xylene, and 17% ethylbenzene) to rats (0, 250, or 500 mg/kg/day) and

mice (0, 500 or 1000 mg/kg/day) for 5 days/week for 103 weeks. There was no evidence of carcinogenicity. No studies are available regarding cancer in animals exposed via inhalation to mixed xylene or the individual xylene isomers. (EU Method B.32) (ECHA)

IARC, OSHA, NTP, IRIS, ACGIH, EU CLP 1272/2008 : not listed

ACGIH: A4

- Pentane : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- 2-Methylpentane : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Ethylbenzene : IARC : Group 2B (Possibly Carcinogenic to Humans)
US EPA IRIS : D (Not classifiable as to human carcinogenicity)
ACGIH : A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans)
- n-Heptane : IRIS : D (Not classifiable as to human carcinogenicity)
- n-Hexane : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Benzene : IARC : Group 1
EU CLP 1272/2008 : Car. 1A
ACGIH : A1
NTP : K
- Hexahydrobenzene : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed

○ Germ cell mutagenicity : Category 1B

- Gasoline : EU CLP 1272/2008 : Muta. 1B : (Note P : The classification as a mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene(EINECS No 200-753-7).
- Toluene : in vitro; Bacterial reverse mutation test : negative (EU Method B.13/14) (ECHA)
In vitro Mouse Lymphoma cell Gene Mutation Test: negative (OECD TG 476) (ECHA)
In vivo mouse(male); rodent dominant lethal assay : negative (OECD TG 478) (ECHA)
- Xylene : in vitro mammalian chromosome aberration test: negative (EU Method B.10) (ECHA), In vitro sister chromatid exchange assay in mammalian cells : negative (EU Method B.19) (ECHA)
In vivo rodent dominant lethal assay: negative (OECD TG 478) (mixed xylenes) (ECHA)
- Pentane : In vitro (bacterial reverse mutation assay; negative (OECD TG 471), In Vitro Mammalian Chromosome Aberration Test : negative (EU Method B.10, GLP) (ECHA)
In Vivo Mammalian Erythrocyte Micronucleus Test; negative (EU Method B.12, GLP) (ECHA)
- 2-Methylpentane : In vitro bacterial reverse mutation assay : negative (OECD TG 471) (ECHA)
In vivo : not available
- Ethylbenzene : In Vitro Mammalian Chromosome Aberration Test : negative (OECD TG 473) (ECHA), In Vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476, GLP) (ECHA)
In Vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474, GLP) (ECHA), In vivo unscheduled DNA synthesis : negative (OECD TG 486, GLP)

- (ECHA)
- n-Heptane : In vitro bacterial reverse mutation assay : negative (OECD TG 471) (ECHA), In Vitro Mammalian Chromosome Aberration Test : negative (OECD TG 473) (ECHA)
In vivo : not available
 - n-Hexane : In vitro bacterial reverse mutation assay: negative (OECD TG 471, GLP) (ECHA); in vitro mouse lymphoma Cell Gene Mutation test: negative (with metabolic activation) and positive (without metabolic activation) (OECD TG 476) (ECHA)
In vivo Mouse(Male) Dominant Lethal test, negative (ECHA)
 - Benzene : In vitro bacterial reverse mutation assay: negative (OECD TG 471) (ECHA); in vitro Chinese Hamster lung fibroblast cell Chromosome Aberration Test (EPA OPPTS 870.5375): positive (ECHA)
In vivo Mouse(Male) Erythrocyte Micronucleus test: positive (OECD TG 474) (ECHA); in vivo Mouse Bone Marrow Chromosome Aberration Test (OECD TG 475) and Germ cell Chromosome Aberration test (OECD TG 483): both positive (ECHA)
 - Hexahydrobenzene : In vitro bacterial reverse mutation assay : negative (OECD TG 471) (ECHA), In Vitro Mammalian Cell Gene Mutation Test : negative (OECD TG 476) (ECHA)
In vivo Mammalian Bone Marrow Chromosome Aberration Test : negative (OECD TG 475, GLP) (ECHA)

○ **Reproductive toxicity : Category 2**

- Gasoline : rat; two-generation reproductive toxicity; No adverse effects on reproductive parameters (OECD TG 416, GLP) (ECHA)
rat; developmental toxicity; No evidence of teratogenicity was observed in fetuses from pregnant dams exposed to the test material (OECD TG 414) (ECHA)
- Toluene : rat; inhalation; reproductive toxicity study; 600, 2000 ppm; Toluene showed no effects on fertility in rats, however, decreased sperm count was reported at 2000 ppm. The NOAEC for this effect was 600 ppm. (ECHA)
rat; inhalation; developmental toxicity; Animal studies indicate that toluene is not teratogenic however there is evidence of developmental toxicity (lower birth weight, delayed vaginal opening) at exposures = 1000 ppm in the presence of slight maternal toxicity; the NOAEC for developmental and maternal effects is 600 ppm (2261 mg/m³). Findings suggestive of an increased risk of late spontaneous abortions associated with exposure to toluene at levels around 88 ppm (330 mg/m³) were considered by the Commission Group of Specialised Experts in the fields of Carcinogenicity, Mutagenicity and Reprotoxicity to require confirmation, while the EU Scientific Committee on Occupational Exposure Limits SCOEL (2001) noted that abortions have not been reported upon accidental high exposure or toluene abuse by pregnant women. (ECHA)
- Xylene : 500 ppm mixed xylene (administered for 6 hours per day for 131 days prior to mating, during mating and continuing through gestation and lactation) is a NOAEC for systemic and reproductive toxicity. (ECHA)
Overall it is concluded that xylene isomers are not developmental toxicants. (OECD TG 414) (ECHA)
- Pentane : rat(male/female); 0 (air), 500, 2000, and 7000 ppm; Two-Generation Reproduction Toxicity Study; There were no adverse treatment regarding

reproductive function. (OECD TG 416, GLP) (read across: Cyclohexane) (ECHA)
rat; oral; 0, 100, 500, or 1000 mg/kg/day; Prenatal Developmental Toxicity Study;
There were no signs of maternal toxicity at any dose level. There were no
treatment-related changes in mean body weight, body weight gain, uterine
weight, corrected body weight, food consumption, or uterine implantation data.
There were no treatment-related mortalities or clinical signs of toxicity. The
maternal NOAEL is 1000 mg/kg/day. (OECD TG 414, GLP) (ECHA)

- 2-Methylpentane : Not available
- Ethylbenzene : rat(male/female); 0, 25, 100, 500 ppm; two-generation reproductive toxicity;
There were no adverse effects on reproductive or developmental endpoints at
dose levels up to 500 ppm. (OECD TG 416, GLP) (ECHA)
rat; There was no evidence of teratogenicity with ethylbenzene in rats at dose
levels up to 2000 ppm. (OECD TG 414) (ECHA)
- n-Heptane : rat; 0, 900, 3000, 9000 ppm; two-generation reproductive toxicity; The NOAEL
for both male and female rats (adults and offspring) was 3000 ppm. The LOAEL
for these groups was 9000 ppm based on reduced body weight. There were no
adverse effects on reproduction, therefore the NOAEL for reproduction is 9000
ppm. (OECD TG 416, GLP) (ECHA)
rat; 400, 1200 ppm; developmental toxicity; Under the design of the study the
test substance, hydrocarbons, C7-C9, isoalkanes, produced no negative effects.
(read across : MRD-78-26) (ECHA)
- n-Hexane : rat(male); inhalation : vapor; reproduction toxicity study; Testicular tubular
atrophy of rats was observed at 5000 ppm, a wide range of testicular lesions
were observed that did not recover within the recovery period, weight gain
and decreased food intake, accompanied by early neuropathy; LOEC(male) >
5000ppm (OECD TG 403)
mouse; fetal toxicity/teratogenicity; inhalation : vapor; gestation days 6-17; 0,
200, 1000, 5000 ppm; In the 200 and 5000 ppm concentration groups, uterine
weight loss was observed. In the 5000 ppm concentration group, the number
of implants decreased.; NOAEC(maternal toxicity) = 1000 ppm (ECHA)
- Benzene : rat(male/female); inhalation : vapor; one-generation reproductive toxicity; 0, 3.2,
32, 320, 960 mg/m³; NOAEC = 960 mg/m³ air; No treatment related effects
were seen in pup survival or at gross post mortem on postnatal day 21 (OECD
TG 415)(ECHA)
- Hexahydrobenzene : rat; 0 (air), 500, 2000, 7000 ppm; two-generation reproductive toxicity; Parental
effects were restricted to transient sedation from study day 15-16 (NOAEC 500
ppm) and body weight effects (NOAEC 2000 ppm). There was, however, no
adverse effect on reproductive function in male or female rats following
exposures up to 7000 ppm. (OECD TG 416, GLP) (ECHA)
rat; developmental toxicity; Cyclohexane was not a developmental toxin in
female rats exposed during pregnancy. The foetal NOAEC was 7000 ppm, and
the maternal NOAEC was 500 ppm (based upon transient sedation) or 2000
ppm (based upon significant reductions in absolute and adjusted body weight
gain). (OECD TG 414, GLP) (ECHA)

○ **Specific target organ toxicity (single exposure) : Not classified**

- Gasoline : oral; rat; Loose stools and incoordination were the only clinical effects seen and

there was observed only on the day after the dosing (OECD TG 401, GLP) (ECHA)

inhalation: vapour; rat; There were no remarkable clinical signs noted during the course of treatment (OECD TG 403, GLP) (ECHA)

- Toluene : Toluene is rapidly absorbed mainly through inhalation and acts on the central nervous system. Toluene causes fatigue, sleepiness, dizziness and mild respiratory irritation at 50-100 ppm, excitement associated with paresthesia and nausea at 200-400 ppm and central nervous system suppression leading to drunkenness, delirium and abnormal gait at 500-800 ppm (NITE)
- Xylene : inhalation; Clinical observations including body tremors suggestive of CNS involvement were seen at all concentrations during and after exposure, on the day of exposure. (ECHA)
- Pentane : Inhalation of high concentrations of the vapour may cause depression of the central nervous system. (INCHEM)
- 2-Methylpentane : Not available
- Ethylbenzene : Not available
- n-Heptane : inhalation; rat; No clinical signs observed throughout the study. LC50 > 29.29 mg/L air/4h, no deaths (OECD TG 403) (ECHA)
- n-Hexane : Although there is descriptions in EHC 122 (1993), ACGIH (7th, 2001), DFGOT vol.4 (1992), and PATTY (4th, 1994) referring to confirmation of giddiness, central nervous system depressant, etc. as acute inhalation toxicity in humans, it was judged that these effects were caused by anesthetic actions. (NITE)
- Benzene : Not available
- Hexahydrobenzene : inhalation; rat; acute inhalation exposure did not appear to produce upper airway irritation. LC50 > 32.880 mg/L air/4h, no deaths (OECD TG 403) (ECHA)

○ **Specific target organ toxicity (repeated exposure) : Category 2, 구분 2**

- Gasoline : oral; rat; kidney effects are specific to male rats and are not considered to be of biological relevance to humans (read-across: unleaded gasoline) (ECHA)
dermal; mouse; Unleaded gasoline did not display chronic dermal toxicant properties in this study (read-across: unleaded gasoline) (OECD TG 453, GLP) (ECHA)
inhalation: vapour; rat; no consistent, compound-related changes were seen in mortality, hematology or clinical chemistry parameters in either species (OECD TG 453) (ECHA)
- Toluene : rat; oral; 90days; 312, 625, 1250, 2500, 5000 mg/kg/day; Absolute or relative weight increase; NOAEL = 625 mg/kg bw/day (EU method B.26, GLP) (ECHA)
rat; inhalation; 103weeks; 0, 2261, 4522 mg/m³; Toluene caused local toxicity to rat nasal epithelium at concentrations of 600 ppm (2250 mg/m³) and above. (OECD TG 453, GLP) (ECHA)
rat; inhalation; 90days; 100, 625, 1250, 2500 and 3000 ppm; Toluene exposure at concentrations = 1250 ppm, 6h/day, 5 days per week for 15 weeks induced adverse clinical signs, lower bodyweight and changes in haematology and organ weights. NOAEC = 925 ppm (EU method B.29, GLP) (ECHA)
Affects the central nervous system, liver, hearing, kidneys and lungs
- Xylene : For mixed xylenes Where ethylbenzene is >=10%, classification under CLP as

STOT-RE Cat 2 H373 is proposed [see Specific Investigations: other studies (ototoxicity)].

The NOAEC of mixed xylenes for male rats exposed 6h/day for 5 days in each of 13 weeks was 3515 mg/m³.

A NOAEC of 3515 mg/m³ was reported by Carpenter et al. (1975) for generalised systemic effects in male rats and male dogs. Other studies have shown that some xylene isomers adversely affect hearing in the rat, with a sub-chronic NOAEC of 1950 mg/m³ reported for p-xylene; the NOAEC for ototoxicity of m-xylene and o-xylene was greater than 7810 mg/m³ (Gagnaire et al., 2001). The ototoxicity of mixed xylenes appears to be dependent upon composition (Gagnaire et al., 2007), with a sub-chronic LOAEC of 1080 mg/m³ reported for one sample while another had a NOAEC of 2170 mg/m³. (ECHA)

- Pentane : oral; rat; 4 weeks; 0.5, 2.0 g/kg/day; n-Pentane's ability to cause hydrocarbon nephropathy was determined to be comparable to the saline control (not significantly different). (ECHA)
inhalation; rat; 13 weeks; Inhalation exposure to n-pentane at concentrations ≤20,000 mg/m³ did not cause any observable adverse effects in male or female rats. NOAEC = 20000 mg/m³ air(lack of any effects). (OECD TG 413, GLP) (ECHA)
- 2-Methylpentane : inhalation; rat; 1500 ppm; 14 weeks; There were no signs of neuropathy in any of the animals in the Frontali et al. study on 2-methylpentane. After the exposure period ended, samples of nerves were processed for light microscopy. Sections of teased nerve fibers showed no pathological alterations of tissue from the 2-methylpentane-exposed animals. There was a significant decrease in body weight gain for 2-methylpentane. There were no significant differences in hindlimb spread but there was high individual variability. Rats treated with n-hexane developed the typical giant axonal degeneration. The 24-h urine sample from rats exposed to 1500 ppm 2-methylpentane showed only 1 metabolite, 2-methyl-2-pentanol. (ECHA)
- Ethylbenzene : In subchronic inhalation toxicity study with rats, ototoxicity(hearing loss) was observed(NOAEC=ca 2.13 mg/L air).
In the sedentary animals, hearing loss and OHC (outer hair cell) damage were observed at 2.27 mg/L and above, but not at 2.13 mg/L. In the active rats, functional and histological damage was observed at 1.70 mg/L and above, but not at 1.28 mg/L. These results show that the ototoxic potency of styrene exposure depends on the physical activity of the animals as this is related to the ventilation rate and, in turn, to the uptake of the chemical via the lungs. In the experiment investigating the combined effects of noise and styrene, noise alone or styrene alone were found without effect; however, both hearing loss and OHC damage were observed in the animals exposed to noise and
- n-Heptane : inhalation; rat; 16 weeks; 12.47 mg/L; Normal-heptane is not a neurotoxicant in this assay system. (ECHA)
- n-Hexane : rat(male); oral; once daily for 90 days, except for animals at the 46.2 mmol/kg dose which were treated for 120 days; 6.6, 13.2, 46.2 mmol/kg; Neurological effects were only seen at the highest dose level after an average of 101.3 days of exposure. The LOAEL for neurological effects is 46.2 mmol/kg bw (37973 mg/kg), and the NOAEL is 13.2 mmol/kg bw (1135 mg/kg). Reduced body weight gain was seen at all three dose levels, however was only considered

treatment related in the 13.2 and 46.2 mmol/kg bw groups. The NOAEL is therefore 6.60 mmol/kg bw. (ECHA)

rat; inhalation; 16 weeks; 3000 ppm; The LOAEC for sub-chronic exposure to hexane vapors was 3000 ppm based on reduced body weight gain, mortality and neurological effects. (ECHA)

- Benzene : After repeated dose exposure via oral or inhalation routes, benzene causes adverse effects on the haematopoietic system of animals and humans. ECHA)
- Hexahydrobenzene : inhalation; rat; 0 (air), 500, 2000, 7000 ppm; 90 days; The NOAEC for subchronic toxicity was 7000 ppm (24,080 mg/m³), based on an absence of adverse effects on body weight, haematology, clinical chemistry, tissue histopathology. The increased liver weights and centrilobular hepatocellular hypertrophy observed in males only at 7000 ppm is an adaptive physiological change considered not to be an adverse systemic effect. The NOAEC for acute, transient CNS effects was 500 ppm. (EPA OPPTS 870.3465, GLP) (ECHA)

○ Aspiration hazard : Category 1

- Gasoline : If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis (NITE)
EU CLP 1272/2008 : Asp. Tox 1
- Toluene : viscosity : 0.64 mm²/s (40°C) & hydrocarbons (ECHA)
- Xylene : 0.74 mm²/s (20°C) (ECHA) & hydrocarbons
- Pentane : dynamic viscosity is 0.374mm²/s at 20 °C (calculated from the viscosity 0.234mPa·s, and the density of 0.62624g/cm³ at 20 °C) (J-GHS) & hydrocarbons; n-pentane is considered an aspiration hazard, as it may cause lung damage if swallowed. (SIDS)
- 2-Methylpentane : Not available
- Ethylbenzene : 0.641 mm²/s (40°C) (ECHA) & hydrocarbons
- n-Heptane : 0.641 mm²/s (20 °C) (ECHA) & hydrocarbons
If swallowed the substance easily enters the airways and could result in aspiration pneumonitis. (ICSC)
- n-Hexane : viscosity : <= 20.5 mm²/s (40 °C) & hydrocarbons (NITE)
- Benzene : 0.604 mPa·s (25.0 °C, dynamic) & Hydrocarbons (ECHA)
The direct aspiration of liquid benzene into the lungs causes immediate pulmonary oedema and haemorrhage at the site of contact with the pulmonary tissue (OECD SIDS)
- Hexahydrobenzene : 0.894 mPa · s (25 °C). (ECHA) & hydrocarbons
"possible to cause chemical pneumonia by miswallowing of the liquid" (ICSC)

12. ECOLOGICAL INFORMATION

1) Ecotoxicity

- Acute toxicity : Not classified (ATEmix>1mg/L)
- LONG-TERM HAZARDS TO THE AQUATIC ENVIRONMENT : Category 3

○ Acute (short-term) aquatic hazard:

Fish

- Gasoline : 96h-LL50(*Pimephales promelas*) = 10 mg/L (OECD TG 203, GLP) (ECHA)
- Toluene : 96h-LC50(*Oncorhynchus kistutch*) = 5.5 mg/L (ECHA)
- Xylene : 96h-LC50(*Oncorhynchus mykiss*) = 2.6 mg/L, static (OECD TG 203) (ECHA)
- Pentane : 96h-LC50(*Oncorhynchus mykiss*) = 4.26 mg/L (OECD TG 203, GLP) (ECHA)
- 2-Methylpentane : Not available
- Ethylbenzene : 96h-LC50(*Oncorhynchus mykiss*) = 4.2 mg/L (OECD TG 203) (ECHA)
- n-Heptane : No toxic effects occur within the range of water solubility. (ECHA)
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Benzene : 96h-LC50(*Oncorhynchus mykiss*) = 5.3 mg/L (OECD TG 203)(ECHA)
- Hexahydrobenzene : 96h-LC50(*Pimephales promelas*) = 4.53 mg/L (OECD TG 203) (ECHA)

Invertebrates

- Gasoline : 48h-EL50(*Daphnia magna*) = 4.5 mg/L (OECD TG 202, GLP) (ECHA)
- Toluene : 48h-LC50(*Ceriodaphnia dubia*) = 3.78 mg/L (US EPA 600/4-91-003) (ECHA)
- Xylene : 48h-EC50(*Daphnia magna*)=8.5 mg/L (SIDS)
- Pentane : 48h-EC50(*Daphnia magna*) = 2.7 mg/L (ECHA)
- 2-Methylpentane : 48h-LC50(*Daphnia magna*) = 3.649 mg/L (ECHA)
- Ethylbenzene : 48h-EC50(*Daphnia magna*) = 1.8 - 2.4 mg/L (ECHA)
- n-Heptane : 48h-EC50(*Daphnia magna*) = 1.5 mg/L (ECHA)
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Benzene : 48h-EC50(*Daphnia magna*) = 10 mg/L (OECD TG 202)(ECHA)
- Hexahydrobenzene : 48h-EC50(*Daphnia magna*) = 0.9 mg/L (OECD TG 202) (ECHA)

Aquatic algae

- Gasoline : 72h-ErL50(*Pseudokirchneriella subcapitata*) = 3.1 mg/L (OECD TG 201, GLP) (ECHA)
- Toluene : 72h-EC50(*Chlamydomonas angulosa*) = 134 mg/L (ECHA)
- Xylene : 72h-ErC50(*Pseudokirchneriella subcapitata*)=4.7 mg/L, static (OECD TG 201) (ECHA)
- Pentane : 72h-ErC50(*Scenedesmus capricornutum*) = 10.7 mg/L (OECD TG 201, GLP) (ECHA)
- 2-Methylpentane : 96h-EC50(*Green Algae*) = 4.321 mg/L (ECHA)
- Ethylbenzene : 96h-EC50(*Skeletonema costatum*) = 4.9 mg/L (US EPA, GLP) (ECHA)
- n-Heptane : Not available
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Benzene : 72h-ErC50(*Pseudokirchneriella subcapitata*) = 100 mg/L (OECD TG 201, GLP)(ECHA)
- Hexahydrobenzene : 72h-ErC50(*Pseudokirchneriella subcapitata*) > 4.425 mg/L (OECD TG 201, GLP) (ECHA)

○ Chronic (Long-term) aquatic hazard:

Fish

- Gasoline : Not available
- Toluene : 40d-NOEC(*Oncorhynchus kistutch*) = 1.39 mg/L (ECHA)
- Xylene : NOEC(*Oncorhynchus mykiss*)>=1.3 mg/L(mixed xylenes) (SIDS)
- Pentane : Not available
- 2-Methylpentane : Not available
- Ethylbenzene : Not available
- n-Heptane : Not available
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Benzene : 32d-LOEC(*Pimephales promelas*) = 1.6 mg/L (ASTM 1984)(ECHA)
- Hexahydrobenzene : Not available

Invertebrates

- Gasoline : 21d-NOELR(Daphnia magna) = 2.6 mg/L (OECD TG 211, GLP) (ECHA)
- Toluene : 7d-NOECreproduction(Ceriodaphnia dubia) = 0.74 mg/L (US EPA 600/4-91-003)(ECHA)
- Xylene : 21d-NOEC(Daphnia magna)=1.57 mg/L, static(OECD TG 211, GLP) (ECHA)
- Pentane : Not available
- 2-Methylpentane : Not available
- Ethylbenzene : 7d-NOEC(Ceriodaphnia dubia) = 0.96 mg/L (ECHA)
- n-Heptane : 21d-NOEC(Daphnia magna) = 0.17 mg/L (OECD TG 211, GLP) (ECHA)
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Benzene : 7d-NOEC(Ceriodaphnia dubia) = 3 mg/L (US EPA 600/4-91-003)(ECHA)
- Hexahydrobenzene : Not available

Aquatic algae

- Gasoline : 72h-NOELR(Pseudokirchneriella subcapitata) = 0.5 mg/L (OECD TG 201, GLP) (ECHA)
- Toluene : Not available
- Xylene : Not available
- Pentane : 72h-NOErC(Scenedesmus capricornutum) = 7.51 mg/L (OECD TG 201, GLP) (ECHA)
- 2-Methylpentane : Not available
- Ethylbenzene : 96h-NOEC(Skeletonema costatum) = 4.5 mg/L (US EPA, GLP) (ECHA)
- n-Heptane : Not available
- n-Hexane : Not available
- Benzene : Not available
- Hexahydrobenzene : 72h-NOErC(Pseudokirchneriella subcapitata) = 0.9525 mg/L (OECD TG 201, GLP) (ECHA)

2) Persistence and degradability

○ Persistence

- Gasoline : log Kow = 4.2 (estimated) (EPISUITE)
- Toluene : log Kow = 2.73 (20 °C) (ECHA)
- Xylene : log Kow=3.16 (20 °C) (ECHA)
- Pentane : log Kow = 3.45 (25 °C) (ECHA)
- 2-Methylpentane : log Kow = 3.214 (25 °C) (ECHA)
- Ethylbenzene : log Kow=3.6 (20 °C) (ECHA)
- n-Heptane : log Kow = 4.5 (ECHA)
- n-Hexane : log Kow = 4 (20°C)(ECHA)
- Benzene : log Kow = 2.13 (ECHA)
- Hexahydrobenzene : log Kow = 3.44 (20 °C) (ECHA)

○ Degradability

- Gasoline : The lack of a suitable leaving group renders compounds resistant to hydrolysis (ECHA)
- Toluene : Calculated phototransformation half-life in air : 2.59 days (ECHA)
- Xylene : The estimated half life of the xylene isomers and ethylbenzene is about 1-2 days based on a recommended reaction rate with hydroxyl radicals and the concentration of hydroxyl radicals recommended in the ECHA guidance. (ECHA)
- Pentane : The atmospheric half-life of n-pentane is estimated to be 3.95 days. (ECHA)
- 2-Methylpentane : Not available
- Ethylbenzene : Half-life in air: 2.3 d (ECHA)
- n-Heptane : Not available

- n-Hexane : Not available
- Benzene : calculated phototransformation half-life in air : 13.4days (ECHA)
- Hexahydrobenzene : Not available

3) Bioaccumulative potential

○ Bioaccumulation

- Gasoline : BCF = 272.9 (estimated) (EPISUITE)
- Toluene : BCF = 90 (ECHA)
- Xylene : The highest calculated BCF is 25.9. (ECHA)
- Pentane : BCF = 171 (calculated) (ECHA)
- 2-Methylpentane : BCF = 61.37 (EPISUITE)
- Ethylbenzene : BCF=110 L/kg ww (ECHA)
- n-Heptane : BCF = 552 (ECHA)
- n-Hexane : BCF = 501.187 (estimated)(ECHA)
- Benzene : BCF = 13 (ECHA)
- Hexahydrobenzene : BCF = 167 (ECHA)

○ Biodegradation

- Gasoline : 77.05% degradation after 28 days; readily biodegradable (read-across: CAS No. 64741-78-2) (OECD TG 301 F, GLP) (ECHA)
- Toluene : 80% degradation after 20days; readily biodegradable (ECHA)
- Xylene : 98 % degradation (28 d) (OECD TG 301F, GLP) (ECHA)
- Pentane : 87 % degradation after 28 days; readily biodegradable (OECD TG 301F, GLP) (ECHA)
- 2-Methylpentane : ca. 93 - ca. 94 % degradation after 28d; readily biodegradable (OECD TG 301C, GLP) (ECHA)
- Ethylbenzene : 70-80 % degradation after 28 days; readily biodegradable (GLP) (ECHA)
- n-Heptane : 70% degradation after 10d; readily biodegradable (ECHA)
- n-Hexane : 98% degradation after 28days; readily biodegradable (OECD TG 301 F, GLP)(ECHA)
- Benzene : 96% degradation after 28days; readily biodegradable (ECHA)
- Hexahydrobenzene : 77 % degradation after 28d; readily biodegradable (OECD TG 301F, GLP) (ECHA)

4) Mobility in soil

- Gasoline : Koc = 4413 (estimated) (EPISUITE)
- Toluene : Koc = 205 (calculated) (ECHA)
- Xylene : Koc=246-540 (HSDB)
- Pentane : Koc = 794.3 (ECHA)
- 2-Methylpentane : Koc = 610.3 (EPISUITE)
- Ethylbenzene : Koc=541.4 (EPISUITE)
- n-Heptane : Koc = 239.7 (ECHA)
- n-Hexane : Koc = 2187.76 (estimated)(ECHA)
- Benzene : Koc = 134 (ECHA)
- Hexahydrobenzene : Koc = 770 (ECHA)

5) Hazard to the ozone layer

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable

- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

6) Other adverse effects

- Gasoline : Not available
- Toluene : Not available
- Xylene : Not available
- Pentane : Not available
- 2-Methylpentane : Not available
- Ethylbenzene : Not available
- n-Heptane : Not available
- n-Hexane : Not available
- Benzene : Not available
- Hexahydrobenzene : Not available

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Waste must be disposed of in accordance with federal, state and local environmental control regulation.

2) Special precaution for disposal

- Consider the required attentions in accordance with waste treatment management regulation.

14. TRANSPORT INFORMATION

1) UN No.

- 1203

2) Proper shipping name

- MOTOR SPIRIT or GASOLINE or PETROL

3) Transport hazard class(es)

- 3

4) Packing group

- II

5) Marine pollutant

- Not applicable

6) Special safety response for transportation or transportation measure

- Types of Emergency Measures in Case of Fire : F-E
- Types of Emergency Measures in Leakage : S-E

15. REGULATORY INFORMATION

EINECS(or ELINCS)

- Gasoline : European EINECS phase-in substance

- Toluene : European EINECS phase-in substance
- Xylene : European EINECS phase-in substance
- Pentane : European EINECS phase-in substance
- 2-Methylpentane : European EINECS phase-in substance
- Ethylbenzene : European EINECS phase-in substance
- n-Heptane : European EINECS phase-in substance
- n-Hexane : European EINECS phase-in substance
- Benzene : European EINECS phase-in substance
- Hexahydrobenzene : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

Substances restricted under REACH

- Gasoline : Substances restricted under REACH
- Toluene : Substances restricted under REACH
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Substances restricted under REACH
- Hexahydrobenzene : Substances restricted under REACH

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ Occupational Safety and Health Act

- Gasoline : Substance subject to submission of process safety reports
- Toluene : Substance subject to occupational exposure limits, Substance subject to permissible exposure limits, Hazardous substance subject to control, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- Xylene : Substance subject to occupational exposure limits, Hazardous substance subject to control, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- Pentane : Substance subject to occupational exposure limits, Substance subject to submission of process safety reports

reports

- 2-Methylpentane : Substance subject to occupational exposure limits, Substance subject to submission of process safety reports
- Ethylbenzene : Substance subject to occupational exposure limits, Hazardous substance subject to control, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- n-Heptane : Substance subject to occupational exposure limits, Hazardous substance subject to control, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- n-Hexane : Substance subject to occupational exposure limits, Substance subject to permissible exposure limits, Hazardous substance subject to control, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- Benzene : Substance subject to occupational exposure limits, Substance subject to permissible exposure limits, Special management substance, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- Hexahydrobenzene : Substance subject to occupational exposure limits, Hazardous substance subject to control, Harmful agents subject to work environment monitoring, Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports

○ **K-REACH**

- Gasoline : Not applicable
- Toluene : Phase-in Substances subject to Registration
- Xylene : Phase-in Substances subject to Registration, Substance subject to intensive control (2019)
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Phase-in Substances subject to Registration, Substance subject to intensive control (2019)
- Hexahydrobenzene : Phase-in Substances subject to Registration

○ **Chemical Control Act in Korea**

- Gasoline : Not applicable
- Toluene : Toxic substance, Substance requiring preparation for accidents, List of substance subjected to the PRTR
- Xylene : Toxic substance, List of substance subjected to the PRTR
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : List of substance subjected to the PRTR
- n-Heptane : Not applicable
- n-Hexane : List of substance subjected to the PRTR
- Benzene : Toxic substance, Substance requiring preparation for accidents, List of substance subjected to the PRTR
- Hexahydrobenzene : Toxic substance, List of substance subjected to the PRTR

○ **Safety Control of Dangerous Substances Act**

- Gasoline : Not applicable
- Toluene : Dangerous substance

- Xylene : Dangerous substance
- Pentane : Dangerous substance
- 2-Methylpentane : Dangerous substance
- Ethylbenzene : Dangerous substance
- n-Heptane : Dangerous substance
- n-Hexane : Dangerous substance
- Benzene : Dangerous substance
- Hexahydrobenzene : Dangerous substance

U.S.A

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

CERCLA Designation of hazardous substances (40 CFR 302.4)

- Gasoline : Not applicable
- Toluene : US management information(CERCLA regulation)
- Xylene : US management information(CERCLA regulation)
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : US management information(CERCLA regulation)
- n-Heptane : Not applicable
- n-Hexane : US management information(CERCLA regulation)
- Benzene : US management information(CERCLA regulation)
- Hexahydrobenzene : US management information(CERCLA regulation)

CERCLA Section 302 regulation

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

CERCLA Section 304 regulation

- Gasoline : Not applicable
- Toluene : Not applicable

- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

○ CERCLA Section 313 regulation

- Gasoline : Not applicable
- Toluene : US management information(CERCLA Section 313 regulation)
- Xylene : US management information(CERCLA Section 313 regulation)
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : US management information(CERCLA Section 313 regulation)
- n-Heptane : Not applicable
- n-Hexane : US management information(CERCLA Section 313 regulation)
- Benzene : US management information(CERCLA Section 313 regulation)
- Hexahydrobenzene : US management information(CERCLA Section 313 regulation)

Interntional Convention on Environment

○ Rotterdam Convention list

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

○ Stockholm Convention list

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

○ Montreal Protocol list

- Gasoline : Not applicable
- Toluene : Not applicable

- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

National Inventory

○ Korea

- Gasoline : Not applicable
- Toluene : Not applicable
- Xylene : Not applicable
- Pentane : Not applicable
- 2-Methylpentane : Not applicable
- Ethylbenzene : Not applicable
- n-Heptane : Not applicable
- n-Hexane : Not applicable
- Benzene : Not applicable
- Hexahydrobenzene : Not applicable

○ U.S.A

- Gasoline : Not applicable
- Toluene : US TSCA phase-in substance
- Xylene : US TSCA phase-in substance
- Pentane : US TSCA phase-in substance
- 2-Methylpentane : US TSCA phase-in substance
- Ethylbenzene : US TSCA phase-in substance
- n-Heptane : US TSCA phase-in substance
- n-Hexane : US TSCA phase-in substance
- Benzene : US TSCA phase-in substance
- Hexahydrobenzene : US TSCA phase-in substance

○ China

- Gasoline : Not applicable
- Toluene : China phase-in substance
- Xylene : China phase-in substance
- Pentane : China phase-in substance
- 2-Methylpentane : China phase-in substance
- Ethylbenzene : China phase-in substance
- n-Heptane : China phase-in substance
- n-Hexane : China phase-in substance
- Benzene : China phase-in substance
- Hexahydrobenzene : China phase-in substance

○ Japan

- Gasoline : Not applicable
- Toluene : Japan ENCS phase-in substance

- Xylene : Japan ENCS phase-in substance
- Pentane : Japan ENCS phase-in substance
- 2-Methylpentane : Japan ENCS phase-in substance
- Ethylbenzene : Japan ENCS phase-in substance
- n-Heptane : Japan ENCS phase-in substance
- n-Hexane : Japan ENCS phase-in substance
- Benzene : Japan ENCS phase-in substance
- Hexahydrobenzene : Japan ENCS phase-in substance

16. OTHER INFORMATION

1) Reference

- Sources of information used in preparing this SDS included one or more of the following: Internal technical data, data from OECD eChemPortal, ECHA, NITE, TOXNET, IPCS and KOSHA search results.

2) Issue Date

- 2008-07-25

3) Revision number and Last date revised

Number of revised

- 11

Date of last revision

- 2024-01-11

Last Revision History

- We have reviewed the ingredient content and revised the 3. COMPOSITION/INFORMATION ON INGREDIENTS sections. No changes to the hazard classification.

4) Other

- The information contained in the Safety Data Sheet is at the date of its issuance to the best of our knowledge correct according to the data available to us. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.