

SDS(Safety Data Sheet)

Product	Gasoline(Prime)	
List No.	Issuing date	Last revised date
PD1036	2008-07-25	2020-07-21

1. IDENTIFICATION

1) Product name

Gasoline(Prime)

2) Recommended use of the chemical and restriction on use

- Recommended use (Fuel)
- 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 2

SELF-HEATING SUBSTANCES AND MIXTURES : Category 2

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

2) Label elements

○ Hazard pictograms



○ Signal word

Danger

○ Hazard statements

- H225 Highly flammable liquid and vapour.
- H252 Self-heating in large quantities; may catch fire.
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.

- H340 May cause genetic defects.
- H350 May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).
- H361 Suspected of damaging fertility or the unborn child (state specific effect if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).
- H373 May cause damage to organs (or state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).

○ **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/sparks/open flames/hot surfaces. - No smoking.
- P233 Keep container tightly closed.
- P235 + P410 Keep cool. Protect from sunlight.
- 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.
- P264 Wash ... thoroughly after handling.
- P280 Wear protective gloves/protective clothing/eye protection/face 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.
- P407 Maintain air gap between stacks/pallets.
- P413 Store bulk masses greater than designate the capacity at temperatures not exceeding designate the temperature(see section 7).
- P420 Store away from other materials.

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(Prime)	2	3	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	Methylbenzene ; Methylbenzol ; Phenyl methane ; Methacide ; Toluol ; 1-Methylbenzene	108-88-3	203-625-9	0 ~ 5
Xylene	Xylol ; Methyltoluene	1330-20-7	215-535-7	0 ~ 5
Pentane	Amyl hydride ; Normal pentane ; N-Pentane ;	109-66-0	203-692-4	0 ~ 4
2-Methylpentane	Pentane, 2-methyl- ; 1,1-Dimethylbutane ; Isohexane ;	107-83-5	203-523-4	0 ~ 2
Ethylbenzene	Benzene, ethyl- ; Ethyl benzene ; Ethylbenzol ; Phenylethane ;	100-41-4	202-849-4	0 ~ 2
n-Heptane	Dipropyl methane ; Heptyl hydride ;	142-82-5	205-563-8	0 ~ 1
n-Hexane	Dipropyl ; Hexyl hydride ; n-Hexane	110-54-3	203-777-6	0 ~ 1
Benzene	Benzol ; Benzole ; Bicarburet of hydrogen ; Coal naphtha ; Clohexatriene ; Phene ; Phenyl hydride ; Polystream ; Pyrobenzol ; Pyrobenzole ; Cyclohexatriene ; Benzine ; 1,3,5-Cyclohexatriene ;	71-43-2	200-753-7	0 ~ 0.4
Hexahydrobenzene	Benzenehexahydride ; Hexahydrobenzene ; Hexamethylene ; Hexanaphthene ; Cyclohexane	110-82-7	203-806-2	0 ~ 0.2

4. FIRST AID MEASURES

1) Eye contact

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

least 20 minutes.

- If eye irritation persists: Get medical advice/attention.

2) Skin contact

- Get medical attention immediately.

- Remove and isolate contaminated clothing and shoes.

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

- In case of contact with substance, immediately flush skin 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.

- Wash skin with soap and water.

- If skin irritation occurs: Get medical advice/attention.

- Take off immediately all contaminated clothing and wash it before reuse.

3) Inhalation

- Move victim to fresh air.

- Get medical attention immediately.

- Give artificial respiration if victim is not breathing.

- 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.

- Keep victim warm and quiet.

- 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

- Get medical attention immediately.

- 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.

- Small fire: Dry chemical (Suitable extinguishing media)

- Small fire: Water spray (Suitable extinguishing media)

- Small fire: Regular foam (Suitable extinguishing media)

- For mixtures containing alcohol or polar solvent: Alcohol-resistant foam (Suitable extinguishing media)
- For mixtures containing alcohol or polar solvent: Alcohol-resistant foam
- Water (Unsuitable extinguishing media)
- Direct water (Unsuitable extinguishing media)
- Large fire: Water spray/fog (Suitable extinguishing media)
- Large fire: Foam (Suitable extinguishing media)

2) Special hazards arising from the substance or mixture

- Unstable at room temperature.
- Can form explosive mixtures at temperatures at or above the flashpoint.
- May ignite on contact with moist air or moisture.
- Fire may produce irritating, corrosive and/or toxic gases.
- Highly flammable liquid and vapour.
- Heating may cause a fire or explosion.
- Self-heating in large quantities; may catch fire.

3) Special protective equipment and precautions for firefighters

- Rescuers should put on appropriate protective gear.
- Cautions ; Most of liquids are lighter than water
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Substance may be transported hot.
- Move containers from fire area if you can do it without risk.
- 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.
- 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.
- Do not touch or walk through spilled material.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- 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.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks

with no fire.

- Please note that materials and conditions to be avoided.

2) Environmental precautions

- Runoff may cause pollution.
- Large spill: Prevent entry into waterways, sewers, basements or confined areas.
- Prevent entry into waterways, sewers, basements or confined areas.

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.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Large Spill: Dike far ahead of liquid spill for later disposal.
- Use clean non-sparking tools to collect absorbed material.

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.
- Cuation: Heat
- Measure atmospheric oxygen concentration and ventilate the area during the operation since low-closed area can cause oxygen deficiency.
- 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.
- Keep cool. Protect from sunlight.
- Store away from other materials.
- 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)
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Gasoline	Not available	TWA, 300 ppm (890 mg/m ³) STEL, 500 ppm (1480 mg/m ³)	Not available	Not available
Toluene	TWA : 50 ppm STEL : 150 ppm	TWA 20 ppm (75 mg/m ³)	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	TWA 100 ppm (434 mg/m ³), STEL, 150 ppm (651 mg/m ³)	PEL: 100 ppm	1.5 g/g creatinine Medium: urine Time: end of shift Parameter: Methylhippuric acids
Pentane	TWA : 600 ppm STEL : 750 ppm	TWA, 1000 ppm (2950 mg/m ³)	PEL: 1000 ppm	Not available
2-Methylpentane	TWA : 500 ppm STEL : 1,000 ppm	TWA, 500 ppm (1760 mg/m ³) STEL, 1000 ppm (3500 mg/m ³)	Not available	Not available
Ethylbenzene	TWA : 100 ppm STEL : 125 ppm	TWA, 20 ppm (87 mg/m ³)	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	TWA, 400 ppm (1640 mg/m ³) STEL, 500 ppm (2050 mg/m ³)	PEL: 500 ppm	Not available
n-Hexane	TWA : 50 ppm	TWA, 50 ppm (176 mg/m ³)	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	TWA, 0.5 ppm (1.6 mg/m ³) STEL, 2.5 ppm (8 mg/m ³)	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	TWA, 100 ppm (350 mg/m ³)	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	Yellow
Smell	No Data
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	-90.5~95.4 °C
Boilling Point (Numerical value)	32 °C ~ 210 °C
Flash Point (Numerical value)	-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 (Numerical value)	No Data
Vapor Density	3~4 (Air=1)
Specific Gravity	0.7~0.8
Distribution Coefficient	2.1~6
Selflgnition Temperature	280~456 °C
Pyrolysis Temperature	No Data

Viscosity (Numerical value)	0.5 mm ² /s (at 40°C)
Molecular Weight	No Data

10. STABILITY AND REACTIVITY

- 1) Chemical Stability and hazardous reactivity**
 - Unstable at room temperature.
 - Impact or high temperatures can cause violent decomposition.
 - Can 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.
 - Runoff may create fire or explosion hazard.
 - May re-ignite after fire is extinguished.
 - Fire may produce irritating, corrosive and/or toxic gases.
- 2) Conditions to avoid**
 - Moisture
 - Heat
 - Ignition source(heat, spark, flame)
 - Ignition source(heat, spark, flame, friction, shock, contamination)
- 3) Incompatible materials**
 - Water
 - Combustibles
- 4) Hazardous decomposition products**
 - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
 - Irritating, corrosive and/or toxic gas.

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 : LD50 14000 mg/kg rat
- Toluene : Rat(Male); LD50 = 5580 mg/kg (EU Method B.1) (Toxicology 4, 5-15)(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 : LD50 > 3750 mg/kg rabbit
- Toluene : Rabbit(Male); LD50 > 5000 mg/kg (Toxicology 4, 5-15)(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 Guideline 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 : vapor LC50 > 5.2 mg/l 4 hr rat
- Toluene : Rat(Male/female) ;inhalation: Vapours, LC50 = 28.1 mg/L 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; mild irritating
- 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 Guideline 404)(ECHA)
- Benzene : Rabbit; Irritating (OECD Guideline 404)(ECHA)
- Hexahydrobenzene : rabbit; not irritating (EU Method B.4) (ECHA)

○ **Serious eye damage/irritation : Not classified**

- Gasoline : rabbit; Not irritating
- 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 sensitizing
- 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
ACGIH : A4
- 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, NTP, IRIS, OSHA, ACGIH, EU CLP 1272/2008 : not listed
- 2-Methylpentane : IARC, OSHA, NTP, IRIS, ACGIH, EU CLP 1272/2008 : 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, OSHA, NTP, IRIS, ACGIH, EU CLP 1272/2008 : 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 Guideline 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)

○ **Reproductive toxicity : Category 2**

- Gasoline : No clear basis for reproductive toxicity
- Toluene : rat(male/female); inhalation : vapor; reproductive toxicity study; 2261, 7537 mg/m³; Decreased sperm count and epididymis at 7537 mg/m³; NOAEC (P) = 2261 mg/m³ (ECHA); Fetal developmental toxicity and teratogenicity (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 Guideline 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 Guideline 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 : Not available
- 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**

- Gasoline : Not available
- Toluene : rat(male/female)); oral; 90days; Absolute or relative weight increase; NOAEL = 625 mg/kg bw/day (EU method B.26)(ECHA)
rat(male/female); inhalation; 103weeks; Local Toxicity of Nasal Epithelium; NOAEC = 2250 mg/m3 (OECD TG453, GLP)(ECHA)
rat(male/female); inhalation; 90days; Clinical symptoms, weight change, long-term brain, heart, lung, male relative testis and hematological changes
Leukocyte reduction, Plasma cholinesterase activity; NOAEC = 2355 mg/m3 (EU method B.29, GLP)(ECHA)

- Affects the central nervous system, liver, hearing, kidneys and lungs
- Xylene : For mixed xylenes Where ethylbenzene is $\geq 10\%$, 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 : Inhalation exposure to n-pentane at concentrations $\leq 20,000$ mg/m³ did not cause any observable adverse effects in male or female rats. (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)

mouse(male/female); subchronic inhalation : vapor; 13weeks; 0, 500, 1000, 4000, 10,000 ppm; The LOAEC for female mice was 500 ppm based on nasal lesions. No NOAEC was found for female mice. The LOAEC for male mice was 1000 ppm based on nasal lesions, and the NOAEC was 500 ppm (OECD Guideline 413) (ECHA)

- Benzene : mouse(male/female); inhalation : vapor; 2-16 weeks; 0, 10, 25, 100, 300, 400 ppm; NOAEC = 10 ppm; causes hematotoxicity to mouse (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 : may cause pneumonia when swallow
- Toluene : viscosity : 0.64 mm²/s & 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 0.234mPs-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 : 점도 <= 20.5 mm²/s & 탄화수소류 (ECHA)
- Hexahydrobenzene : 0.894 mPa · s (25 °C). (ECHA) & hydrocarbons
possible to cause chemical pneumonia by misswallowing of the liquid (ICSC)

12. ECOLOGICAL INFORMATION

1) Ecotoxicity

- Acute toxicity : Not classified (ATEmix>1mg/L)
- Chronic toxicity : Not classified

○ Acute (short-term) aquatic hazard:

Fish

- Benzene : 96h-LC50(Oncorhynchus mykiss) = 5.3 mg/L (OECD Guideline 203)(ECHA)
- Ethylbenzene : 96h-LC50(Oncorhynchus mykiss) = 4.2 mg/L (OECD TG 203) (ECHA)
- 2-Methylpentane : Not available
- Toluene : 96h-LC50(Oncorhynchus kistutch) = 5.5 mg/l (ECHA)

- Pentane : 96h-LC50(*Oncorhynchus mykiss*) = 4.26 mg/L (OECD TG 203, GLP) (ECHA)
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Hexahydrobenzene : 96h-LC50(*Pimephales promelas*) = 4.53 mg/L (OECD TG 203) (ECHA)
- n-Heptane : No toxic effects occur within the range of water solubility. (ECHA)
- Xylene : 96h-LC50(*Oncorhynchus mykiss*) = 2.6 mg/L, static (OECD TG 203) (ECHA)
- Gasoline : LC50 82 mg/l 96 hr (IUCLID)

Invertebrates

- Benzene : 48h-EC50(*Daphnia magna*) = 10 mg/L (OECD Guideline 202)(ECHA)
- Ethylbenzene : 48h-EC50(*Daphnia magna*) = 1.8 - 2.4 mg/L (ECHA)
- 2-Methylpentane : 48h-LC50(*Daphnia magna*) = 3.649 mg/L (ECHA)
- Toluene : 48h-EC50(*Ceriodaphnia dubia*) = 3.78mg/L (US EPA 600/4-91-003)(ECHA)
- Pentane : 48h-EC50(*Daphnia magna*) = 2.7 mg/L (ECHA)
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Hexahydrobenzene : 48h-EC50(*Daphnia magna*) = 0.9 mg/L (OECD TG 202) (ECHA)
- n-Heptane : 48h-EC50(*Daphnia magna*) = 1.5 mg/L (ECHA)
- Xylene : 48h-EC50(*Daphnia magna*)=8.5 mg/L (SIDS)
- Gasoline : EC50 170 mg/l 24 hr (IUCLID)

Aquatic algae

- Benzene : 72h-ErC50(*Pseudokirchneriella subcapitata*) = 100 mg/L (OECD Guideline 201, GLP)(ECHA)
- Ethylbenzene : 96h-EC50(*Skeletonema costatum*) = 4.9 mg/L (US EPA, GLP) (ECHA)
- 2-Methylpentane : 96h-EC50(*Green Algae*) = 4.321 mg/L (ECHA)
- Toluene : 72h-EC50(*Chlamydomonas angulosa*) = 134 mg/L (ECHA)
- Pentane : 72h-ErC50(*Scenedesmus capricornutum*) = 10.7 mg/L (OECD TG 201, GLP) (ECHA)
- n-Hexane : No toxic effects occur within the range of water solubility. (ECHA)
- Hexahydrobenzene : 72h-ErC50(*Pseudokirchneriella subcapitata*) > 4.425 mg/L (OECD TG 201, GLP) (ECHA)
- n-Heptane : Not available
- Xylene : 72h-ErC50(*Pseudokirchneriella subcapitata*)=4.7 mg/L, static (OECD TG 201) (ECHA)
- Gasoline : EC50 56 mg/l 72 hr *Selenastrum capricornutum* (IUCLID)

○ Chronic (Long-term) aquatic hazard:

Fish

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

Invertebrates

- Benzene : 7d-NOEC(*Ceriodaphnia dubia*) = 3 mg/L (US EPA 600/4-91-003)(ECHA)
- Ethylbenzene : 7d-NOEC(*Ceriodaphnia dubia*) = 0.96 mg/L (ECHA)
- 2-Methylpentane : Not available

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

Aquatic algae

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

2) Persistence and degradability

○ Persistence

- Benzene : log Kow = 2.13 (ECHA)
- Ethylbenzene : log Kow=3.6 (20 °C) (ECHA)
- 2-Methylpentane : log Kow = 3.214 (25 °C) (ECHA)
- Toluene : log Kow = 2.73 (20 °C) (ECHA)
- Pentane : log Kow = 3 (20 °C) (ECHA)
- n-Hexane : log Kow = 4 (20°C)(ECHA)
- Hexahydrobenzene : log Kow = 3.44 (20 °C) (ECHA)
- n-Heptane : log Kow = 4.5 (ECHA)
- Xylene : log Kow=3.16 (20 °C) (ECHA)
- Gasoline : log Kow 2 (2-7) (ICSC)

○ Degradability

- Benzene : calculated phototransformation half-life in air : 13.4days (ECHA)
- Ethylbenzene : Half-life in air: 2.3 d (ECHA)
- 2-Methylpentane : Not available
- Toluene : Calculated phototransformation half-life in air : 2.59 days (ECHA)
- Pentane : The atmospheric half-life of n-pentane is estimated to be 3.95 days. (ECHA)
- n-Hexane : Not available
- Hexahydrobenzene : Not available
- n-Heptane : Not available
- 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)
- Gasoline : Not available

3) Bioaccumulative potential

○ **Bioaccumulation**

- Benzene : BCF = 13 (ECHA)
- Ethylbenzene : BCF=110 L/kg ww (ECHA)
- 2-Methylpentane : BCF = 61.37 (EPISUITE)
- Toluene : BCF = 90 (ECHA)
- Pentane : BCF = 171 (calculated) (ECHA)
- n-Hexane : BCF = 501.187 (Estimate)(ECHA)
- Hexahydrobenzene : BCF = 167 (ECHA)
- n-Heptane : BCF = 552 (ECHA)
- Xylene : The highest calculated BCF is 25.9. (ECHA)
- Gasoline : BCF 340 (estimated)

○ **Biodegradation**

- Benzene : 96% degradation after 28days; readily biodegradable (ECHA)
- Ethylbenzene : 70-80 % degradation after 28 days; readily biodegradable (GLP) (ECHA)
- 2-Methylpentane : ca. 93 - ca. 94 % degradation after 28d; readily biodegradable (OECD TG 301C, GLP) (ECHA)
- Toluene : 80% degradation after 20days; readily biodegradable (ECHA)
- Pentane : 87 % degradation after 28 days; readily biodegradable (OECD TG 301F, GLP) (ECHA)
- n-Hexane : 98% degradation after 28days; readily biodegradable (OECD TG 301 F, GLP)(ECHA)
- Hexahydrobenzene : 77 % degradation after 28d; readily biodegradable (OECD TG 301F, GLP) (ECHA)
- n-Heptane : 70% degradation after 10d; readily biodegradable (ECHA)
- Xylene : 98 % degradation (28 d) (OECD TG 301F, GLP) (ECHA)
- Gasoline : Not available

4) Mobility in soil

- Benzene : Koc = 134 (ECHA)
- Ethylbenzene : Koc=541.4 (EPISUITE)
- 2-Methylpentane : Koc = 610.3 (EPISUITE)
- Toluene : Koc = 34 - 120 (ECHA)
- Pentane : Koc = 874.5 (EPISUITE)
- n-Hexane : Koc = 2187.76 (Estimate)(ECHA)
- Hexahydrobenzene : Koc = 770 (ECHA)
- n-Heptane : Koc = 239.7 (ECHA)
- Xylene : Koc=246-540 (HSDB)
- Gasoline : Not available

5) Hazard to the ozone layer

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

6) Other adverse effects

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

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

- n-Heptane : European EINECS phase-in substance
- Xylene : European EINECS phase-in substance
- Gasoline : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

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

Substances restricted under REACH

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

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ Occupational Safety and Health Act

- Benzene : Substance subject to occupational exposure limits, Substance subject to permissible exposure limits, Hazardous substance subject to control, Special management substance, Harmful agents subject to work environment monitoring(Measurement cycle: 1 Year), Harmful agents subject to workers requiring health examination, 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(Measurement cycle: 1 Year), Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- 2-Methylpentane : Substance subject to occupational exposure limits, 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(Measurement cycle: 1 Year), 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

- 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(Measurement cycle: 1 Year), 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(Measurement cycle: 1 Year), 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(Measurement cycle: 1 Year), 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(Measurement cycle: 1 Year), Harmful agents subject to workers requiring health examination, Substance subject to submission of process safety reports
- Gasoline : Substance subject to submission of process safety reports

○ **K-REACH**

- Benzene : Phase-in Substances subject to Registration, Substance subject to intensive control (2019), Phase-in Substances
- Ethylbenzene : Phase-in Substances
- 2-Methylpentane : Phase-in Substances
- Toluene : Phase-in Substances subject to Registration, Phase-in Substances
- Pentane : Phase-in Substances
- n-Hexane : Phase-in Substances
- Hexahydrobenzene : Phase-in Substances subject to Registration, Phase-in Substances
- n-Heptane : Phase-in Substances
- Xylene : Phase-in Substances subject to Registration, Substance subject to intensive control (2019), Phase-in Substances
- Gasoline : Phase-in Substances

○ **Chemical Control Act in Korea**

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

○ **Safety Control of Dangerous Substances Act**

- Benzene : Dangerous substance
- Ethylbenzene : Dangerous substance
- 2-Methylpentane : Dangerous substance
- Toluene : Dangerous substance
- Pentane : Dangerous substance

- n-Hexane : Dangerous substance
- Hexahydrobenzene : Dangerous substance
- n-Heptane : Dangerous substance
- Xylene : Dangerous substance
- Gasoline : Not applicable

U.S.A

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

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

○ CERCLA Designation of hazardous substances (40 CFR 302.4)

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

○ CERCLA Section 302 regulation

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

○ CERCLA Section 304 regulation

- Benzene : Not applicable
- Ethylbenzene : Not applicable
- 2-Methylpentane : Not applicable
- Toluene : Not applicable
- Pentane : Not applicable

- n-Hexane : Not applicable
- Hexahydrobenzene : Not applicable
- n-Heptane : Not applicable
- Xylene : Not applicable
- Gasoline : Not applicable

○ **CERCLA Section 313 regulation**

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

Interntional Convention on Environment

○ **Rotterdam Convention list**

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

○ **Stockholm Convention list**

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

○ **Montreal Protocol list**

- Benzene : Not applicable
- Ethylbenzene : Not applicable
- 2-Methylpentane : Not applicable
- Toluene : Not applicable
- Pentane : Not applicable

- n-Hexane : Not applicable
- Hexahydrobenzene : Not applicable
- n-Heptane : Not applicable
- Xylene : Not applicable
- Gasoline : Not applicable

National Inventory

○ Korea

- Benzene : Phase-in Substances
- Ethylbenzene : Phase-in Substances
- 2-Methylpentane : Phase-in Substances
- Toluene : Phase-in Substances
- Pentane : Phase-in Substances
- n-Hexane : Phase-in Substances
- Hexahydrobenzene : Phase-in Substances
- n-Heptane : Phase-in Substances
- Xylene : Phase-in Substances
- Gasoline : Phase-in Substances

○ U.S.A

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

○ China

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

○ Japan

- Benzene : Japan ENCS phase-in substance
- Ethylbenzene : Japan ENCS phase-in substance
- 2-Methylpentane : Japan ENCS phase-in substance
- Toluene : Japan ENCS phase-in substance
- Pentane : Japan ENCS phase-in substance

- n-Hexane : Japan ENCS phase-in substance
- Hexahydrobenzene : Japan ENCS phase-in substance
- n-Heptane : Japan ENCS phase-in substance
- Xylene : Japan ENCS phase-in substance
- Gasoline : Not applicable

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

- 8

☐ Date of last revision

- 2020-07-21

☐ Last Revision History

- The composition (CAS No. 8006-61-9 → 86290-81-5) is changed by considering the material definition and physical and chemical properties.

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.