

SDS(Safety Data Sheet)

Product	Aviation Gasoline 100LL(Blue Dye)	
List No.	Issuing date	Last revised date
PD1137	2013-11-12	2020-07-21

1. IDENTIFICATION

1) Product name

Aviation Gasoline 100LL(Blue Dye)

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

SKIN CORROSION/IRRITATION : Category 2

SERIOUS EYE DAMAGE/EYE 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.
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H319 Causes serious eye 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.
- 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.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- 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.
- P337 + P313 If eye irritation persists: 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
Aviation Gasoline 100LL(Blue Dye)	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	85 ~ 95
Toluene	Methylbenzene ; Methylbenzol ; Phenyl methane ; Methacide ; Toluol ; 1-Methylbenzene	108-88-3	203-625-9	5 ~ 15
Benzene	Benzol ; Benzole ; Bicarburet of hydrogen ; Coal naphtha ; Clohextatriene ; Phene ; Phenyl hydride ; Polystream ; Pyrobenzol ; Pyrobenzole ; Cyclohexatriene ; Benzine ; 1,3,5-Cyclohexatriene ;	71-43-2	200-753-7	0 ~ 0.2
Tetraethyl lead	Tetraethyllead ; Lead tetraethyl ; Tetraethyl plumbane ; Plumbane, tetraethyl- ; Tetraethyl lead ; Tetra Ethylene Lead ; Lead, tetraethyl- ; Tetraethylplumbane	78-00-2	201-075-4	0.06

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 IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- 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.

- Immediately call a POISON CENTER or doctor/physician.
- 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
- 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

- Can form explosive mixtures at temperatures at or above the flashpoint.
- Fire may produce irritating, corrosive and/or toxic gases.
- Highly 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.
 - 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.
 - 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.
- 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	TWA, 300 ppm (890 mg/m3) STEL, 500 ppm (1480 mg/m3)	Not available	Not available

Toluene	TWA : 50 ppm STEL : 150 ppm	TWA 20 ppm (75 mg/m3)	PEL: 200 ppm, C 300 ppm mg/m3	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)
Benzene	TWA : 0.5 ppm STEL : 2.5 ppm	TWA, 0.5 ppm (1.6 mg/m3) STEL, 2.5 ppm (8 mg/m3)	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)
Tetraethyl lead	TWA : 0.075 mg/m3	TWA 0.1 mg/m3, as Pb, Vapor and Aerosol	PEL: 0.075 mg/m3	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 paticle 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) respireatory 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	석유냄새
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	-58 °C
Boilling Point (Numerical value)	25 °C ~ 170 °C
Flash Point (Numerical value)	-43 °C
Evaporating Rate	No Data
Flammability(Solid, Gas)	No Data
Explosibility Range	1.2~7.6 %
Steam Pressure	No Data

Solubility (Numerical value)	No Data
Vapor Density	No Data
Specific Gravity	0.665~0.735 g/cm ³ at 15°C
Distribution Coefficient	2.7~6
Selfignition Temperature	280 ~456 °C
Pyrolysis Temperature	No Data
Viscosity (Numerical value)	No Data
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.
 - Containers may explode when heated.
 - HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
 - Runoff may create fire or explosion hazard.
 - Fire may produce irritating, corrosive and/or toxic gases.
- 2) Conditions to avoid**
 - Heat
 - Ignition source(heat, spark, flame)
 - 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.
 - 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)
- Benzene : Rat(Male); LD50 > 2000 mg/kg (OECD TG 401)(ECHA)
- Tetraethyl lead : rat(male/female); LD50 = 14.18 mg/kg bw (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)
- Benzene : Rabbit(Male); LD50 > 9400 mg/kg (OECD Guideline 402)(ECHA)
- Tetraethyl lead : Not available

*** Inhalation(Gas) - Not applicable**

- Gasoline : Not applicable
- Toluene : Not applicable
- Benzene : Not applicable
- Tetraethyl lead : 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)
- Benzene : Rat(Male) ;inhalation: Vapours, LC50 = 43.767 mg/L 4h (OECD TG 403)(ECHA)
- Tetraethyl lead : rat; LC50 = ca. 0.85 mg/L air/1h (-> conversion value by 4-hour exposure : ca. 0.425 mg/L air/4h) (ECHA)

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

- Gasoline : Not available
- Toluene : Not available
- Benzene : Not available
- Tetraethyl lead : Not available

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

- Gasoline : rabbit; mild irritating
- Toluene : Rabbit; Irritating (EU Method B.4, GLP)(ECHA)
- Benzene : Rabbit; Irritating (OECD Guideline 404)(ECHA)
- Tetraethyl lead : The substance is irritating to the skin. (INCHEM)

○ Serious eye damage/irritation : Category 2 (EYE IRRITATION Cat. 2)

- Gasoline : rabbit; Not irritating
- Toluene : Rabbit; slightly irritating (OECD TG 405, GLP) (ECHA)
- Benzene : Rabbit; irritating (ECHA)
- Tetraethyl lead : Irritating to eyes. (HSDB)

○ Respiratory sensitization : Not classified

- Gasoline : Not available
- Toluene : Not available
- Benzene : Not available
- Tetraethyl lead : Not available

○ Skin sensitization : Not classified

- Gasoline : guinea pig; Not sensitizing
- Toluene : Guinea pig; not sensitising (EU Method B.6, GLP)(ECHA)
- Benzene : Guinea pig; not sensitizing (OECD TG 406)(ECHA)
- Tetraethyl lead : Not available

○ **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
- Benzene : IARC : Group 1
EU CLP 1272/2008 : Car. 1A
ACGIH : A1
NTP : K
- Tetraethyl lead : IARC : Group 3 (Not Classifiable)
NTP : Reasonably Anticipated To Be A Human Carcinogen (listed under Lead and lead compounds)
ACGIH : A4 (Not Classifiable as a Human Carcinogen)

○ **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)
- 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)
- Tetraethyl lead : In vitro bacterial reverse mutation assay : negative (EPA OPPTS 870.5265) (ECHA)
In vivo chromosome aberration assay : negative (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)
- 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

- Tetraethyl lead : rat; developmental toxicity; Maternal toxicity was observed and foetal resorption and general retardation of development was encountered at the higher dose levels. It is concluded that lead as TEL is not teratogenic to the mouse or rat. NOAEL reported as 0.1 mg/kg bw/day, LOAEL reported as 1.0 mg/kg bw/day. (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)
- Benzene : Not available
- Tetraethyl lead : oral; rat(male/female); All animals displayed neurological signs including lethargy, irritability and ataxia from day 2. LD50 = 14.18 mg/kg bw (ECHA)
inhalation; rat; Hyperexcitability and continuous body tremours were observed at doses below the lethal dose. LC50 = ca. 0.425 mg/L air/4h (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
- Benzene : mouse(male/female); inhalation : vapor; 2-16 weeks; 0, 10, 25, 100, 300, 400 ppm; NOAEC = 10 ppm; causes hematotoxicity to mouse (ECHA)
- Tetraethyl lead : oral; rat(male); 0, 0.2, 2 mg/kg bw/day; 13 Weeks; Repeat oral toxicity study carried out on groups of male rats, concluded that the first signs of toxicological effects due to TEL were observed at a dose rate of 0.2 mg/kg bw/d. (ECHA)
inhalation; rat(male/female); 12, 22, 46 mg/m³ air; 35 Weeks; An NOEL of greater than 12 mg/m³ air was reported and a LD100 value of 22 mg/m³ quoted. (ECHA)

○ **Aspiration hazard : Category 1**

- Gasoline : may cause pneumonia when swallow
- Toluene : viscosity : 0.64 mm²/s & hydrocarbons (ECHA)
- Benzene : 점도 <= 20.5 mm²/s & 탄화수소류 (ECHA)
- Tetraethyl lead : At 40°C = 0.382 cSt (ECHA) & not hydrocarbons

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)
- Tetraethyl lead : 96h-LC50(*Pleuronectes platessa*) = 0.23 mg/L (ECHA)
- Toluene : 96h-LC50(*Oncorhynchus kistutch*) = 5.5 mg/l (ECHA)
- Gasoline : LC50 82 mg/l 96 hr (IUCLID)

Invertebrates

- Benzene : 48h-EC50(*Daphnia magna*) = 10 mg/L (OECD Guideline 202)(ECHA)
- Tetraethyl lead : 48h-LC50(*Artemia salina*) = 0.085 mg/L (ECHA)
- Toluene : 48h-EC50(*Ceriodaphnia dubia*) = 3.78mg/L (US EPA 600/4-91-003)(ECHA)
- Gasoline : EC50 170 mg/l 24 hr (IUCLID)

Aquatic algae

- Benzene : 72h-EC50(*Pseudokirchneriella subcapitata*) = 100 mg/L (OECD Guideline 201, GLP)(ECHA)
- Tetraethyl lead : Not available
- Toluene : 72h-EC50(*Chlamydomonas angulosa*) = 134 mg/L (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)
- Tetraethyl lead : Not available
- Toluene : 40d-NOEC(*Oncorhynchus kisutch*) = 1.39 mg/L (ECHA)
- Gasoline : Not available

Invertebrates

- Benzene : 7d-NOEC(*Ceriodaphnia dubia*) = 3 mg/L (US EPA 600/4-91-003)(ECHA)
- Tetraethyl lead : Not available
- Toluene : 7d-NOEC(*Ceriodaphnia dubia*) = 0.74 mg/L (US EPA 600/4-91-003)(ECHA)
- Gasoline : Not available

Aquatic algae

- Benzene : Not available
- Tetraethyl lead : Not available
- Toluene : Not available
- Gasoline : Not available

2) Persistence and degradability

○ Persistence

- Benzene : log Kow = 2.13 (ECHA)
- Tetraethyl lead : log Kow = 4.62 (20 °C) (ECHA)
- Toluene : log Kow = 2.73 (20 °C) (ECHA)
- Gasoline : log Kow 2 (2-7) (ICSC)

○ Degradability

- Benzene : calculated phototransformation half-life in air : 13.4days (ECHA)
- Tetraethyl lead : Half-life in air : 12.7 h (ECHA) Half-life for hydrolysis : 7.3 d (ECHA)
- Toluene : Calculated phototransformation half-life in air : 2.59 days (ECHA)
- Gasoline : Not available

3) Bioaccumulative potential

○ Bioaccumulation

- Benzene : BCF = 13 (ECHA)
- Tetraethyl lead : BCF = 92 (ECHA)
- Toluene : BCF = 90 (ECHA)
- Gasoline : BCF 340 (estimated)

○ Biodegradation

- Benzene : 96% degradation after 28days; readily biodegradable (ECHA)
- Tetraethyl lead : 50 % degradation after 5d; Not readily biodegradable (ECHA)
- Toluene : 80% degradation after 20days; readily biodegradable (ECHA)
- Gasoline : Not available

4) Mobility in soil

- Benzene : Koc = 134 (ECHA)
- Tetraethyl lead : Koc = 3994 (EPISUITE)
- Toluene : Koc = 34 - 120 (ECHA)
- Gasoline : Not available

5) Hazard to the ozone layer

- Benzene : Not applicable
- Tetraethyl lead : Not applicable
- Toluene : Not applicable
- Gasoline : Not applicable

6) Other adverse effects

- Benzene : Not available
- Tetraethyl lead : Not available
- Toluene : 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
- Tetraethyl lead : European EINECS phase-in substance
- Toluene : European EINECS phase-in substance
- Gasoline : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Benzene : Not applicable
- Tetraethyl lead : Not applicable
- Toluene : Not applicable
- Gasoline : Not applicable

Substances restricted under REACH

- Benzene : Substances restricted under REACH
- Tetraethyl lead : Substances restricted under REACH
- Toluene : Substances restricted under REACH
- 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
- Tetraethyl lead : Substance subject to occupational exposure limits, Harmful agents subject to workers requiring health examination
- 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
- 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
- Tetraethyl lead : CMR substance, Substance subject to intensive control (2019), Phase-in Substances
- Toluene : Phase-in Substances subject to Registration, 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
- Tetraethyl lead : Toxic substance, List of substance subjected to the PRTR
- Toluene : Toxic substance, Substance requiring preparation for accidents, List of substance subjected to the PRTR
- Gasoline : Not applicable

○ **Safety Control of Dangerous Substances Act**

- Benzene : Dangerous substance
- Tetraethyl lead : Dangerous substance
- Toluene : Dangerous substance
- Gasoline : Not applicable

U.S.A

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

- Benzene : Not applicable
- Tetraethyl lead : Not applicable
- Toluene : Not applicable
- Gasoline : Not applicable

○ **CERCLA Designation of hazardous substances (40 CFR 302.4)**

- Benzene : US management information(CERCLA regulation)
- Tetraethyl lead : US management information(CERCLA regulation)
- Toluene : US management information(CERCLA regulation)
- Gasoline : Not applicable

○ **CERCLA Section 302 regulation**

- Benzene : Not applicable
- Tetraethyl lead : US management information(CERCLA Section 302 regulation)
- Toluene : Not applicable
- Gasoline : Not applicable

○ **CERCLA Section 304 regulation**

- Benzene : Not applicable
- Tetraethyl lead : US management information(CERCLA Section 304 regulation)
- Toluene : Not applicable
- Gasoline : Not applicable

○ **CERCLA Section 313 regulation**

- Benzene : US management information(CERCLA Section 313 regulation)
- Tetraethyl lead : US management information(CERCLA Section 313 regulation)
- Toluene : US management information(CERCLA Section 313 regulation)
- Gasoline : Not applicable

International Convention on Environment

○ **Rotterdam Convention list**

- Benzene : Not applicable
- Tetraethyl lead : Rotterdam Convention list
- Toluene : Not applicable
- Gasoline : Not applicable

○ **Stockholm Convention list**

- Benzene : Not applicable
- Tetraethyl lead : Not applicable
- Toluene : Not applicable
- Gasoline : Not applicable

○ **Montreal Protocol list**

- Benzene : Not applicable
- Tetraethyl lead : Not applicable
- Toluene : Not applicable
- Gasoline : Not applicable

National Inventory

○ **Korea**

- Benzene : Phase-in Substances
- Tetraethyl lead : Phase-in Substances
- Toluene : Phase-in Substances
- Gasoline : Phase-in Substances

○ **U.S.A**

- Benzene : US TSCA phase-in substance
- Tetraethyl lead : US TSCA phase-in substance
- Toluene : US TSCA phase-in substance
- Gasoline : Not applicable

○ **China**

- Benzene : China phase-in substance
- Tetraethyl lead : China phase-in substance
- Toluene : China phase-in substance
- Gasoline : Not applicable

○ **Japan**

- Benzene : Japan ENCS phase-in substance
- Tetraethyl lead : Not applicable
- Toluene : 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

- 2013-11-12

3) Revision number and Last date revised

○ **Number of revised**

- 3

○ **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.