

Material Safety Data Sheet (MSDS)

1. Chemical Product & Company Identification

A. Product Name : S-OIL Brake Fluid DOT 4

○ Part Numbers :

B. Intended Use

: Brake Fluid of automobiles

C. Manufacturer & Supplier information

○ Manufacturer : Kukdong Jeyen Co., Ltd (☎ +82-31-680-0505 Fax. +82-31-680-0507)

○ Address : #1173-4 Wonjeong-ri Poseung-eup Pyeongtaek-si Gyeonggi-do Korea Rep.

○ Supplier : S-OIL CORPORATION CO.,LTD,

○ Address : 192, Baekbeom-ro, Mapo-gu, Seoul 04196, Korea

2. Hazard Identification

A. Hazard Identification

1) Physicochemical : Not Classified

2) Health hazards :

Acute toxicity (Inhalation: Dust/Mist) : Category 4

Serious eye damage/ eye irritation : Category 2

Reproductive toxicity : Category 2

Specific target organ toxicity (repeated exposure): Category 2

3) Environmental hazards : Not Classified

B. Precautionary Statement(s) & Warning Label

1) Symbols



2) Signal Word : Caution

3) Hazard Statement(s)

H319 - Causes serious eye irritation.

H332 - Harmful if inhaled.

H361 - Suspected of damaging fertility or the unborn child.

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

4) Precautionary Statement(s)

■ Precautionary

P201 : Obtain special instructions before use.

P202 : Do not handle until all safety precautions have been read and understood.

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

P261 : Avoid breathing dust/fume/gas/mist/vapours/spray.

P264 : Wash ... thoroughly after handling.

P271 : Use only outdoors or in a well-ventilated area.

P280 : Wear protective gloves/protective clothing/eye protection/face protection.

■ Response

P304+P340 : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

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.

P312 : Call a POISON CENTER or doctor/physician if you feel unwell.

P314 : Get medical advice/attention if you feel unwell.

P337+P313 : If eye irritation persists: Get medical advice/attention.

■ Storage

P405 : Store locked up.

■ Disposal

P501 : Dispose of contents and container in accordance with applicable regulations.

C. Other hazards.

Chemicals Name	NFPA Ratings		
	Health	Fire	Reactivity
1. Poly ethylene glycol Mono Methylether	0	1	0
2. Methoxy tri glycol	0	1	0
3. Tri ethylene glycol monobutyl ether	2	1	0
4. Boron Ester Compound	0	0	0
5. BUSINESS SECRET(S1)	2	1	3

3. Composition / Information on ingredients

Chemical Name	Other name	CAS No.	%
1. Poly ethylene glycol Mono Methylether	Methoxy poly(ethylene glycol)	9004-74-4	6 ~ 14 %
2. Methoxy tri glycol	(2-(2-(2-Methoxy) Ethoxy)-Ethanol)	112-35-6	25 ~ 35 %
3. Tri ethylene glycol monobutyl ether	TRIGLYCOL MONOBUTYL ETHER	143-22-6	3 ~ 11 %
4. Boron Ester Compound	-	30989-05-0	45 ~ 55 %
5. BUSINESS SECRET (S1)	-	-	Max 6 %

4. First aid Measures

A. Eye Contact :

Move to fresh air. Flush thoroughly with water at least 15 minutes.

Get medical assistance.

B. Skin contact :

Wash contact areas with soap and water.

Remove contaminated clothing and shoes.

Get medical aid if irritation develops and persists.

Wash clothing before reuse.

C. Inhalation :

If inhaled, remove to fresh air.

If not breathing give artificial respiration.

Get medical aid.

D. Ingestion :

Potential for aspiration if swallowed.

Get medical aid immediately.

Do not induce vomiting unless directed to do so by medical personnel.

Never give anything by mouth to an unconscious person.

If vomiting occurs naturally, have victim lean forward.

E. Likely Acute or Delayed symptoms/Effects :

1) Inhalation

Short term exposure : Irritation, Sleepinss, Headache, Dizziness, Blood disorder.

Long term exposure : Irritation, Headache.

2) Skin contact

Short term exposure : Vomiting, Gastraigia, Headache, Dizziness, Sleepinss, Hallucination, Convulsions, Coma,
Allergic reaction.

Long term exposure : Irritation, Allergic reaction

3) Eye contact

Short term exposure : Irritation

Long term exposure : No data available

4) Ingestion

Short term exposure : Vomiting, Gastraigia, Headache, Dizziness, Sleepinss, Hallucination, Convulsions, Coma.

Long term exposure : Kidney trouble

F. Emergency measure / notes to physician

: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient

5. Fire Fighting Measures

A. Extinguishing media :

1) Suitable extinguishing media

: Fog, foam, dry Chemical powder

2) Unsuitable extinguishing media

: No data available

3) Unusual fire (Big fire)

: Do use extinguishing media with Water fog.

B. Unusual fire & Explosion hazard :

1) Hazardous combustion product : CO (carbon monoxide), CO₂ (carbon dioxide)

2) Fire & Explosion hazard : Slightly flammable to flammable in presence of open flames and sparks, of heat.

Non-flammable in presence of shocks.

C. Special fire fighting procedure / protection of firefighters :

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental Release Measure

A. Personal precautions :

Shut off all sources of ignition.

Wear self-contained breathing apparatus.

B. Environmental precautions :

- 1) Atmosphere release : No data available
- 2) Soil release : No data available
- 3) Underwater release : No data available

C. Spill cleanup methods

- 1) Small liquid spill : Use a non-combustible material like sand to soak up the product and place into a container for later disposal.
- 2) Large spillages : No data available

7. Handling and Storage

A. Handling

- Keep away from heat.
- Keep away from sources of ignition.
- Empty containers pose a fire risk.
- Evaporate the residue under a fume hood.
- Ground all equipment containing material.
- Do not ingest.
- Do not breathe gas/fumes/vapor/spray.
- Wear suitable protective clothing.
- If ingested, seek medical advice.
- Immediately and show the container or the label.
- Keep away from incompatibles such as oxidizing agents, acids, alkalis.

B. Storage

- Keep container tightly closed.
- Keep container in a cool.
- Well-ventilated area.

8. Exposure Controls / Personal Protection

A. Exposure limit value :

1) Poly ethylene glycol Mono Methylether

- Korea : TWA : No data available
STEL : No data available
- ACGIH : VTL-TWA : No data available
VTL-STEL : No data available
- OSHA : No data available

2) Methoxy tri glycol

- Korea : TWA : No data available
STEL : No data available
- ACGIH : VTL-TWA : No data available
VTL-STEL : No data available
- OSHA : No data available

3) Tri ethylene glycol monobutyl ether

- Korea : TWA : No data available

STEL : No data available

ACGIH : VTL-TWA : No data available

VTL-STEL : No data available

OSHA : No data avail

4) Boron Ester Compound

Korea : TWA : No data available

STEL : No data available

ACGIH : VTL-TWA : No data available

VTL-STEL : No data available

OSHA : No data avail

5) BUSINESS SECRET (S1)

Korea : TWA : No data available

STEL : No data available

ACGIH : VTL-TWA : No data available

VTL-STEL : No data available

OSHA : No data avail

B. Engineering Control :

Adequate ventilation (localize ventilation) should be provided in workplaces.

Use non sparking tools.

C. Personal protective equipment

1) Respiratory protection

Prevent inhalation of the solvents.

If required to control exposure, use only suitable respirators and components tested and approved under appropriate government standards such as NIOSH.

2) Eye protection

Wear approved chemical safety glasses or goggles where eye exposure is reasonably probable.

Eye wash fountain is recommended.

3) Hand protection

Wear protective gloves.

Butyl rubber gloves are recommended.

4) Skin / Body protection

Wear protective cloths.

9. Physical and Chemical properties

A. Appearance : Physical state - liquid, Color - Yellow

B. Odor : Mild, Ether

C. Odor Threshold : No data available

D. pH : 7.5 ~ 8.5

E. Melting Point / Freezing Point : No data available

F. Boiling Point / range : More than 255 °C

G. Flash Point : More than 130 °C

H. Evaporation rate : No data available

I. Flammability Limit (Lower/Upper) : 3.0% / 15%

J. Vapor pressure : 0.1 mmHg (20 °C)

K. Solubility in water : Soluble

L. Vapor density (Air=1) : 4

M. Specific Gravity : 1.060 ~ 1.070

N. Partition Coefficient (n-Octanol/Water) : No data available

O. Auto-ignition temperature : Upper 200°C

P. Thermal decomposition : No data available

Q. Viscosity : Below 1100 cst (-40°C)

R. Molecular weight : Not Applicable / Mixture

10. Stability and Reactivity

A. Stability : Stable under normal temperatures and pressures.

B. Possibility of hazardous reaction : Has not been reported.

C. Condition to avoid : Ignition source.

Excess heat, flame.

D. Incompatible material : Oxidizing agents, acid, alkalis.

E. Hazardous decomposition products : Hydrocarbon compounds.

11. Toxicological Information

A. Route of exposure

- 1) Inhalation : No data available
- 2) Ingestion : No data available
- 3) Skin contact : No data available
- 4) Eye contact : No data available

B. Delayed, Immediate, and Chronic effects of Short-and Long-term Exposure

1) Poly ethylene glycol Mono Methylether

Acute toxicity

Oral : LD50 22,000mg/kg Rat

Skin : LD50 20,000mg/kg Rabbit

Inhalation : No data available

Skin contact : Rabbit/Skin(500mg): slight irritation (OPEN DRAIZE TEST)

Eye contact or Irritation : Irritation to eyes

Sensitization : No data available

Carcinogenicity :

KOSHA : Not listed

OSHA : Not listed

NTP : Not listed

IARC (GROUP) : Not listed

ACGIH : Not listed

EC: Not listed

Mutagenesis : No data available

Reproductive toxicity : No data available

Specified target organ general toxicity - single exposure : irritation in the airway when inhale

Specified target organ general toxicity - repetitive exposure : No data available

Aspiration respiratory organs hazard : No data available

2) Methoxy tri glycol

Acute toxicity

Oral : LD50 >3980mg/kg Rat

Skin : LD50 7400mg/kg Rabbit

Inhalation : No data available

- Skin contact : Human - Slight irritation
- Eye contact or Irritation : Rabbit - Slight irritation
- Sensitization : No data available
- Carcinogenicity :
 - KOSHA : Not listed
 - OSHA : Not listed
 - NTP : Not listed
 - IARC (GROUP) : Not listed
 - ACGIH : Not listed
 - EC: Not listed
- Mutagenesis : Invitro / Negative
- Reproductive toxicity : rat / patrilineal / matrilineal influence
- Specified target organ general toxicity - single exposure : No data available
- Specified target organ general toxicity - repetitive exposure : No data available
- Aspiration respiratory organs hazard : No data available

3) Tri Ethylene glycol Mono Buthylether

- Acute toxicity
 - Oral : LD50 5300mg/kg Rat
 - Skin : LD50 2000mg/kg Rabbit
 - Inhalation : No data available
- Skin contact : Slight irritation (10mg, 24hr, Rabbit)
- Eye contact or Irritation : Normal irritation (20mg, 24hr, Rabbit)
- Sensitization : No data available
- Carcinogenicity :
 - KOSHA : Not listed
 - OSHA : Not listed
 - NTP : Not listed
 - IARC (GROUP) : Not listed
 - ACGIH : Not listed
 - EC: Not listed
- Mutagenesis : No data available
- Reproductive toxicity : No data available
- Specified target organ general toxicity - single exposure : No data available
- Specified target organ general toxicity - repetitive exposure : No data available
- Aspiration respiratory organs hazard : No data available

4) Boron Ester Compound

- Acute toxicity
 - Oral : LD50 > 5000mg/kg Rat
 - Skin : LD50 > 2000mg/kg Rat
 - Inhalation : No data available
- Skin contact : No data available
- Eye contact or Irritation : No data available
- Sensitization : No data available
- Carcinogenicity :
 - KOSHA : Not listed
 - OSHA : Not listed
 - NTP : Not listed
 - IARC (GROUP) : Not listed

ACGIH : Not listed

EC: Not listed

- Mutagenesis : No data available
- Reproductive toxicity : No data available
- Specified target organ general toxicity - single exposure : No data available
- Specified target organ general toxicity - repetitive exposure : No data available
- Aspiration respiratory organs hazard : No data available

5) BUSINESS SECRET (S1)

- Acute toxicity
 - Oral : LD50 560mg/kg Rat
 - Skin : LD50 > 1000mg/kg Rabbit
 - Inhalation : Dust LC50 >1.43mg/kg Rat
- Skin contact : Slight irritation
- Eye contact or Irritation : Slight irritation(rabbit)
- Sensitization : No data available
- Carcinogenicity :
 - KOSHA : Not listed
 - OSHA : Not listed
 - NTP : Not listed
 - IARC (GROUP) : Not listed
 - ACGIH : Not listed
 - EC: Not listed
- Mutagenesis : No data available
- Reproductive toxicity : No data available
- Specified target organ general toxicity - single exposure : irritation in the airway when inhale
- Specified target organ general toxicity - repetitive exposure : No data available
- Aspiration respiratory organs hazard : No data available

12. Ecological Information

A. Ecotoxicity

1) Poly ethylene glycol Mono Methylether

- Fishes : No data available
- Crustacea : No data available
- Seaweeds : No data available

2) Methoxy tri glycol

- Fishes : LC50 MIN 10000 mg/l 96 hr *Leuciscus idus*
- Crustacea : EC50 MIN 500 mg/l 48 hr *Daphnia magna*
- Seaweeds : ErC50 > 500 mg/l 72 hr *Scenedesmus subspicatus*

3) Tri Ethylene glycol Mono Buthylether

- Fishes : No data available
- Crustacea : No data available
- Seaweeds : No data available

4) Boron Ester Compound

- Fishes : LC50 590 mg/l 96hr *Salmo gairdneri* (GLP)
- Crustacea : EC50 MIN 1000 mg/l 48hr *Daphnia magna*
- Seaweeds : EC50 430 mg/l 96hr *Selenastrum capricornutum* (GLP)

5) BUSINESS SECRET (S1)

- Fishes : No data available
- Crustacea : No data available
- Seaweeds : No data available

B. Persistence and Degradability

1) Poly ethylene glycol Mono Methylether

- Persistence : log Kow -2
- Degradability : No data available

2) Methoxy tri glycol

- Persistence : log Kow -1.46
- Degradability : No data available

3) Tri Ethylene glycol Mono Buthylether

- Persistence : No data available
- Degradability : BOD5/COD 0.16

4) Boron Ester Compound

- Persistence : log Kow 0.5
- Degradability : No data available

5) BUSINESS SECRET (S1)

- Persistence : log Kow 1.44
- Degradability : No data available

C. Bio accumulation

1) Poly ethylene glycol Mono Methylether

- Accumulation : BCF 3.162

2) Methoxy tri glycol

- Accumulation : BCF 0.046

3) Tri Ethylene glycol Mono Buthylether

- Accumulation : No data available

4) Boron Ester Compound

- Accumulation : No data available

5) BUSINESS SECRET (S1)

- Accumulation : BCF 2.5

D. Ozone layer hazard : Not applicable

E. Mobility in Soil : No data available

F. Other Information : No data available

13. Disposal Consideration

A. Disposal method : Dispose in accordance with all applicable regulations.

B. Disposal instruction : No data available

C. Waste code : No data available

14. Transportation Information

14.1 UN number

ADR/RID: -

IMDG: -

IATA: -

14.2 UN proper shipping name

ADR/RID : Not regulated as dangerous goods

IMDG : Not regulated as dangerous goods

EPCRA 313 regulation(40 CFR372.65) : No
US. Toxic Substances Control Act : Listed
CEPA - Domestic Substances List (DSL) : Listed

4) Boron Ester Compound

E.U : Hazard symbols : No

Risk phrases : No

Safety phrases : No

U.S

OSHA regulation (29 CFR1910.119) : No

CERCLA 103 regulation(40 CFR 302.4) : No

EPCRA 302 regulation(40 CFR355.30) : No

EPCRA 304 regulation(40 CFR355.40) : No

EPCRA 313 regulation(40 CFR372.65) : No

US. Toxic Substances Control Act : Listed

CEPA - Domestic Substances List (DSL) : Listed

5) BUSINESS SECRET (S1)

E.U : Hazard symbols : No

Risk phrases : No

Safety phrases : No

U.S

OSHA regulation (29 CFR1910.119) : No

CERCLA 103 regulation(40 CFR 302.4) : No

EPCRA 302 regulation(40 CFR355.30) : No

EPCRA 304 regulation(40 CFR355.40) : No

EPCRA 313 regulation(40 CFR372.65) : No

US. Toxic Substances Control Act : Listed

CEPA - Domestic Substances List (DSL) : Listed

16. Other Information

The information presented herein is believed to be factual as it has been derived from the works from the works and opinions of persons believed to be qualified experts; however, nothing contained in this information is to be taken as a warrant or representation for which **KUKDONG JEYEN Co., LTD.** Bears legal responsibility. The user should review any recommendation in the specific context of the intended use to determine whether they are appropriate.

A. Issue date :

2013. 04. 01

B. Last revision :

2017. 04. 17 (Rev. 4) - Accordance with GHS regulation