1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product Name: TOPSol 2046
Product Uses: Industrial solvent.
Manufacturer/Supplier: TOP Solvent Company Limited
555/1 Energy Complex Building A, 11th Floor
Viphavadi Rangsit Road Chatuchak, Bangkok 10900
Thailand
Telephone: +66 2 299 0003 or +66 2 797 2993
Fax: +66 2 797 2983
Emergency Telephone Number: +66 2 299 0003 [working hours] or +66 38 683090 ext.103 [out of working hours]
Other Information: TOPSol is a trademark owned by TOP Solvent Company Limited

2. HAZARDS IDENTIFICATION

GHS Classification:
- FLAMMABLE LIQUIDS, Category 4
- SKIN CORROSION/IRRITATION, Category 3
- CARCINOGENICITY, Category 2
- SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (SINGLE EXPOSURE), Category 3
- Narcotic effects.
- ASPIRATION HAZARD, Category 1
- AQUATIC TOXICITY (CHRONIC), Category 3
- AQUATIC TOXICITY (ACUTE), Category 3

GHS label elements
Symbol(s):
![GHS symbol]

Signal words: Danger
GHS Hazard Statements

Physical Hazards : H227 Combustible liquid.
Health Hazards : H304 May be fatal if swallowed and enters airways.
                 H316 Causes mild skin irritation.
                 H336 May cause drowsiness or dizziness.
                 H351 Suspected of causing cancer.

Environmental Hazards : H402 Harmful to aquatic life.
                        H412 Harmful to aquatic life with long lasting effects.

GHS Precautionary statements

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.
             P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
             P271 Use only outdoors or in a well-ventilated area.
             P273 Avoid release to the environment.
             P280 Wear protective gloves/protective clothing/eye protection/face protection.
             P281 Use personal protective equipment as required.

Response : P332+P313 If skin irritation occurs: Get medical advice/attention.
           P304+P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
           P312 Call a POISON CENTER or doctor/physician if you feel unwell.
           P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
           P370+P378 In case of fire: Use appropriate media for extinction.
           P331 Do NOT induce vomiting.
           P308+P313 IF exposed or concerned: Get medical advice/attention.

Storage : P403+P235 Store in a well-ventilated place. Keep cool.
         P405 Store locked up.
         P233 Keep container tightly closed.

Disposal : P501 Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and
3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Identity: Kerosine (petroleum), hydrodesulfurized.
CAS No: 64742-81-0
EINECS No.: 265-184-9

Classification of components according to GHS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Synonyms</th>
<th>CAS</th>
<th>Hazard Class (category)</th>
<th>Hazard statement</th>
<th>Typical Conc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td></td>
<td>91-20-3</td>
<td>Carc. – 2,</td>
<td>H351,H400</td>
<td>&lt; 10 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Acute - 1,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Chronic - 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General Information: Not expected to be a health hazard when used under normal conditions.
Inhalation: Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
Eye Contact: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion: If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3° C), shortness of breath, chest congestion or continued coughing or wheezing. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Give nothing by mouth. Do not induce vomiting.

Notes to physician
Most important symptoms/effects, acute & delayed: Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat,
coughing, and/or difficulty breathing. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.

Immediate medical attention, special treatment

Causes central nervous system depression. Dermatitis may result from prolonged or repeated exposure. Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific Hazards: Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.

Extinguishing Media: Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.

Unsuitable Extinguishing Media: Do not use water in a jet.

Protective Equipment for Firefighters: Wear full protective clothing and self-contained breathing apparatus.

Other Advice: Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Personal Precautions, Protective Equipment and Emergency Procedures: Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For
Environmental Precautions: Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Methods and material for containment and clean up: For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Additional Advice: Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.

7. HANDLING AND STORAGE

General Precautions: Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Precautions for safe Handling:

Avoid contact with skin, eyes, and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (\(<= 1 \text{ m/sec until fill pipe submerged to twice its diameter, then } <= 7 \text{ m/sec}\)). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Handle and open container with care in a well ventilated area. Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded. Do not empty into drains.

Conditions for safe Storage:

Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Bulk storage tanks should be diked (bunded). Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment. Storage Temperature: Ambient.

Product Transfer:

Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (\(<= 1 \text{ m/sec until fill pipe submerged to twice its diameter, then } <= 7 \text{ m/sec}\)). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve.

Recommended Materials:

For containers, or container linings use mild steel, stainless steel. For container paints, use epoxy paint, zinc silicate paint.

Unsuitable Materials:

Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice:

Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

Other Advice:

Ensure that all local regulations regarding handling and
storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

**Occupational Exposure Limits**

<table>
<thead>
<tr>
<th>Material</th>
<th>Source</th>
<th>Type</th>
<th>ppm</th>
<th>mg/m³</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCP Mineral spirits 175 - 220</td>
<td>HSPA OELs</td>
<td>TWA (8h)</td>
<td>350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naphthalene</td>
<td>ACGIH</td>
<td>TWA STEL</td>
<td>10 ppm</td>
<td>15 ppm</td>
<td>Can be absorbed through the skin.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin-Des</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional Information**:
Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes.

<table>
<thead>
<tr>
<th>Material</th>
<th>Source</th>
<th>Hazard Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>IARC</td>
<td>Class 2B - Possibly carcinogenic to humans</td>
</tr>
</tbody>
</table>

**Biological Exposure Index (BEI) - See reference for full details**

<table>
<thead>
<tr>
<th>Material</th>
<th>Determinant</th>
<th>Sampling time</th>
<th>BEI</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>1-Hydroxypyrene, with hydrolysis (1-HP) in Urine</td>
<td>End of shift at end of work week.</td>
<td></td>
<td>ACGIH BEL (2008)</td>
</tr>
</tbody>
</table>

**Appropriate Engineering Controls**:
The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines /limits. Local exhaust ventilation is recommended. Firewater monitors and deluge systems are recommended.
Eye washes and showers for emergency use.

**Individual protection Measures**: Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

**Respiratory Protection**: If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN14387. Where respiratory protective equipment is required, use a fullface mask. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.

**Hand Protection**: Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739, AS/NZS:2161) made from the following materials may provide suitable chemical protection: Longer term protection: Viton. Incidental contact/Splash protection: Nitrile rubber. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

**Eye Protection**: Chemical splash goggles (chemical monogoggles).

**Body protection**: Chemical resistant gloves/gauntlets, boots, and apron. Where risk of splashing or in spillage clean up, use chemical resistant one-piece overall with integral hood.

**Thermal hazards** : Not applicable

**Monitoring Methods**: Monitoring of the concentration of substances in the

Environmental Exposure Controls: Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colourless Liquid.</td>
</tr>
<tr>
<td>Odour</td>
<td>White spirit.</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>Data not available.</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Typical 195 - 260 °C / 383 - 500 °F</td>
</tr>
<tr>
<td>Melting / freezing point</td>
<td>Data not available.</td>
</tr>
<tr>
<td>Flash point</td>
<td>Typical 75 °C / 167 °F (ASTM D93, PMCC)</td>
</tr>
<tr>
<td>Explosion / Flammability limits in air</td>
<td>Data not available.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>229 °C / 444 °F</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Data not available.</td>
</tr>
</tbody>
</table>
Material Safety Data Sheet

Vapour pressure: Typical 20 Pa at 15 °C / 59 °F
Density: Typical 795.0 kg/m³ at 15 °C / 59 °F (ASTM D-1298)
Water solubility: Insoluble
Solubility in other solvents: Aromatics, Miscible
Aliphatics, Miscible
n-octanol/water partition coefficient (log Pow): Data not available.
Decomposition temperature: Note: Stable under normal conditions of use.
Dynamic viscosity: Data not available.
Kinematic viscosity: Data not available.
Vapour density (air=1): Data not available.
Evaporation rate (nBuAc=1): 0.01 (ASTM D 3539, nBuAc=1)

10. STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions of use.
Conditions to Avoid: Avoid heat, sparks, open flames and other ignition sources. Prevent vapour accumulation.
Incompatible materials: Strong oxidising agents.
Hazardous Decomposition Products: Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Possibility of hazardous Reactions: Data not available.
Sensitivity to Static Discharge: Yes, in certain circumstances product can ignite due to static electricity.

11. TOXICOLOGICAL INFORMATION

Information on Toxicological effects

Basis for Assessment: Information given is based on product testing, and/or similar products, and/or components.
Likely routes of exposure: Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.
Material Safety Data Sheet

11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Acute Toxicity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Oral Toxicity</td>
<td>Expected to be of low toxicity: LD50 &gt;5000 mg/kg</td>
</tr>
<tr>
<td>Acute Dermal Toxicity</td>
<td>Expected to be of low toxicity: LD50 &gt;5000 mg/kg</td>
</tr>
<tr>
<td>Acute Inhalation Toxicity</td>
<td>Expected to be of low toxicity: LC50 greater than near saturated vapour concentration, 4 hours, Rat High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea.</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Causes mild skin irritation. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Expected to be non-irritating to eyes.</td>
</tr>
<tr>
<td>Respiratory Irritation</td>
<td>Inhalation of vapours or mists may cause irritation to the respiratory system.</td>
</tr>
<tr>
<td>Respiratory or skin Sensitization</td>
<td>Not expected to be a sensitiser.</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not expected to be mutagenic.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Limited evidence of carcinogenic effect. (Naphthalene)</td>
</tr>
<tr>
<td>Reproductive and Developmental Toxicity</td>
<td>Causes foetotoxicity in animals at doses which are maternally toxic. Not expected to impair fertility.</td>
</tr>
<tr>
<td>Specific target organ toxicity - single exposure</td>
<td>May cause drowsiness or dizziness.</td>
</tr>
<tr>
<td>Specific target organ toxicity - repeated exposure</td>
<td>Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss. Central nervous system: repeated exposure affects the nervous system. Kidney: caused kidney effects in male rats which are not considered relevant to humans.</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

Basis for Assessment : The information given below is based on product testing, a knowledge of the components and the ecotoxicology of similar products.
Material Safety Data Sheet

Fish: Harmful: LL/EL/IL50 >10 - <=100 mg/l
Aquatic Invertebrates: Practically non toxic: LL/EL/IL50 > 100 mg/l
Algae: Harmful: LL/EL/IL50 >10 - <=100 mg/l
Microorganisms: Expected to be harmful: LL/EL/IL50 >10 - <=100 mg/l
Mobility: Floats on water. Adsorbs to soil and has low mobility.
Persistence/degradability: Expected to be readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulative potential: Has the potential to bioaccumulate.

13. DISPOSAL CONSIDERATIONS

Material Disposal: Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.

Container Disposal: Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not, puncture, cut, or weld uncleaned drums. Send to drum recoverer or metal reclaimer.

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Not Regulated
This material is either not classified as dangerous under ADR regulations or need to follow country specific requirements.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is either not classified as dangerous under IATA regulations or need to follow country specific requirements.
Sea (Annex II of MARPOL 73/78 and the IBC code)
Pollution Category : Annex I
Ship Type : 2
Product Name : Kerosene
Special Precaution : Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Chemical Inventory Status
AICS : Listed.  
DSL : Listed.  
INV (CN) : Listed.  
TSCA : Listed.  
EINECS : Listed.  265-185-4  
KECI (KR) : Listed.  KE-25620  
PICCS (PH) : Listed.  

16. OTHER INFORMATION

MSDS Version Number : 2.1
MSDS Effective Date : 1-June-2012
Uses and Restrictions : Raw material for use in the chemical industry. Use only in industrial processes
MSDS Distribution : The information in this document should be made available to all who may handle the product
Disclaimer : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It
should not therefore be construed as guaranteeing any specific property of the product.