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

Product Name : Hexane Polymer
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 : TSOL is a trademark owned by TOP Solvent Company Limited

2. HAZARDS IDENTIFICATION

GHS Classification : FLAMMABLE LIQUIDS, Category 2
SKIN CORROSION/IRRITATION, Category 2
SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (SINGLE EXPOSURE), Category 3 Narcotic effects.
SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (REPEATED EXPOSURE), Category 2
Central nervous system (CNS).
Peripheral nervous system.
ASPIRATION HAZARD, Category 1
TOXIC TO REPRODUCTION, Category 2
AQUATIC TOXICITY (ACUTE), Category 2

GHS label elements
Symbol(s)

Signal words : Danger
GHS Hazard Statements

Physical Hazards: H225 Highly flammable liquid and vapor.

Health Hazards:
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H336 May cause drowsiness or dizziness.
- H361 Suspected to damaging fertility or the unborn child.
- H373 May cause damage to organs or organ system through prolonged or repeated exposure.

Environmental Hazards: H401 Toxic to aquatic life.

GHS Precautionary statements

Prevention:
- 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.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P264 Wash hands thoroughly after handling.
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P281 Use personal protective equipment as required.
- P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P273 Avoid release to the environment.

Response:
- P303+P361+P353 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- P370+P378 In case of fire: Use appropriate media for extinction.
- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P321 Specific treatment (see details on label).
P332+P313: If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P308+P313 If exposed or concerned, 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.
P314 Get medical advice/attention if you fell unwell.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331: Do NOT induce vomiting.

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 national regulations.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Chemical Identity**: Naphtha (petroleum), hydrotreated light

**CAS No**: 64742-49-0

**EINECS No.**: 265-151-9

**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>Conc.</th>
</tr>
</thead>
</table>
4. FIRST AID MEASURES

General Information
Keep victim calm. Obtain medical treatment immediately.

Inhalation
Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

Skin Contact
Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

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
Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Peripheral nerve damage may be evidenced by impairment of motor function (incoordination, unsteady walk, or muscle weakness in the extremities, and/or loss of sensation in the arms and legs). If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty
breathing. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, lightheadedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

Immediate medical attention, special treatment

Potential for chemical pneumonitis. Potential for cardiac sensitisation, particularly in abuse situations. Hypoxia or negative inotropes may enhance these effects. Consider: oxygen therapy. 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 guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.
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. Vapour may form an explosive mixture with air.

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 m/sec until fill pipe submerged to twice its diameter, then <= 7 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**

Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.

**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>n-Hexane</td>
<td>ACGIH</td>
<td>TWA</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SKIN_DES</td>
<td></td>
<td></td>
<td>Can be absorbed through the skin</td>
</tr>
</tbody>
</table>

**Additional Information**: 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. Wash hands before eating, drinking, smoking and using the toilet.

**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>n-Hexane</td>
<td>2,5-Hexanedion, without hydrolysis in Urine</td>
<td>End of shift at end of work week.</td>
<td>0.4 mg/l</td>
<td>ACGIH (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 breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods,
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

Appearance: Colourless Liquid.
Odour: Paraffinic sweet.
Odour threshold: Data not available.
pH: Not applicable.
Boiling point: Typical 65-69 °C / 149-156 °F
Melting / freezing point: Typical -95 °C / -139 °F
Flash point: Typical -27 °C / -17 °F (Abel)
Explosion / Flammability limits in air: 1.1 - 7.4 % (V)
Auto-ignition temperature: 375 °C / 707 °F (ASTM E-659)
Flammability (solid, gas): Yes
Vapour pressure: Typical 8 kPa at 0 °C / 32 °F

Density: Typical 678 kg/m3 at 15 °C / 59 °F (ASTM D-1298)
Water solubility: Negligible
Solubility in other solvents: Hydrocarbon solvent (s) Miscible

n-octanol/water partition coefficient (log Pow): 4
Decomposition temperature : Note: Stable under normal conditions of use.
Dynamic viscosity : Data not available.
Kinematic viscosity : 0.45 mm²/s at 25 °C / 77 °F
Vapour density (air=1) : 2.8
Electrical conductivity : Typical 0.04 pS/m at 20°C.
Evaporation rate (nBuAc=1) : 8 (ASTM D 3539, nBuAc=1)
Volatile organic carbon : 84% (EC/1999/13)
Molecular weight : 86 g/mol

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

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.
Acute Toxicity
   Acute Oral Toxicity : Low toxicity : LD50 >5000 mg/kg , Rat
   Acute Dermal Toxicity : Low toxicity
1. Acute Inhalation Toxicity:
   - Low toxicity if inhaled.
   - High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.

2. Skin corrosion/irritation:
   - Causes mild skin irritation.

3. Serious eye damage/irritation:
   - Not irritating to eye. Vapours may be irritating to the eye.

4. Respiratory Irritation:
   - Data not available

5. Respiratory or skin Sensitization:
   - Not a skin sensitizer.

6. Aspiration hazard:
   - Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

7. Germ cell mutagenicity:
   - Not mutagenic.

8. Carcinogenicity:
   - Not expected to be carcinogenic.
   - Tumours produced in animals are not considered relevant to humans.

9. Reproductive and Developmental Toxicity:
   - Causes foetotoxicity in animals at doses which are maternally toxic. Affects reproductive system in animals at doses which produce other toxic effects. (n-Hexane)

10. Specific target organ toxicity - single exposure:
    - May cause drowsiness or dizziness.

11. Specific target organ toxicity - repeated exposure:
    - Central nervous system: repeated exposure affects the nervous system. Peripheral nervous system: causes peripheral neuropathy which can be potentiated by ketones. (n-Hexane) Kidney: caused kidney effects in male rats which are not considered relevant to humans

12. Additional Information:
    - Cardiovascular system: chronic abuse of similar materials has been associated with irregular heart rhythms and cardiac arrest.

12. ECOLOGICAL INFORMATION

Basis for Assessment:
- Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity
Fish:
- Expected to be harmful: $10 < \text{LC/EC/IC50} \leq 100 \text{ mg/l}$
Aquatic Invertebrates: Expected to be harmful: $10 < \text{LC/EC/IC50} \leq 100 \text{ mg/l}$
Algae: Expected to be toxic: $1 < \text{LC/EC/IC50} \leq 10 \text{ mg/l}$
Microorganisms: Expected to be harmful: $10 < \text{LC/EC/IC50} \leq 100 \text{ mg/l}$
Mobility: Floats on water. Adsorbs to soil and has low mobility.
Persistence/degradability: Expected to be readily biodegradable.
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): Regulated
Class: 3
Packing group: II
Hazard identification no.: 33
UN No.: 1208
Danger label (primary risk): 3
Proper shipping name: HEXANE ()
Environmentally Hazardous: Yes

IMDG
Identification number: UN 1208
Proper shipping name: HEXANES
Class / Division : 3
Packing group : II
Marine pollutant : Yes

IATA (Country variations may apply)
UN No. : 1208
Proper shipping name : Hexanes
Class / Division : 3
Packing group : II

Sea (Annex II of MARPOL 73/78 and the IBC code)
Pollution Category : Y
Ship Type : 2
Product Name : Hexane (all isomers)
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.
ENCS (JP) : Listed.
TSCA : Listed.
EINECS : Listed. 265-151-9
KECI (KR) : Listed. KE-25623
PICCS (PH) : Listed.

16. OTHER INFORMATION

GHS Hazard statements
H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
Material Safety Data Sheet

Hexane Polymer
Version 2.1
Effective Date 1-June-2012

H336  May cause drowsiness or dizziness.
H361  Suspected of damaging fertility or the unborn child.
H373  May cause damage to organs or organ systems through prolonged or repeated exposure.
H411  Toxic to aquatic life with long lasting effects.

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.