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## 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING


- 1) Product identifier: Liquid Paraffin-13
- 2) Relevant identified uses of the substance or mixture and uses advised against:
- 3) Manufacture/Supplier/Distributor information:
  - Manufacture information:
    - Company name: ISU CHEMICAL CO., LTD
    - Address: 8, Seokdang-gil, Onsan-eup, Ulju-gun, Ulsan, Korea
    - Emergency telephone number: Tel. +82 52 231 5587 Fax. +82 52 231 5699

## 2. HAZARD IDENTIFICATION

- 1) Hazard classification: Aspiration hazard: Cat.1
- 2) Allocation label elements including precautionary statements
  - Hazard pictograms
  - Signal word
    - Danger
  - Hazard statements
    - H304: May be fatal if swallowed and enters airways.
  - Precautionary statements
    - Response
      - P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
      - P331: Do not induce vomiting.
    - Storage
      - P405: Store locked up.
    - Disposal
      - P501: Dispose of contents/container to (in accordance with local/regional/national/International regulations.)
- 3) Other hazards:
  - EUH066: Repeated exposure may cause skin dryness or cracking.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	Common name	CAS No.	Concentration (wt%)
Tridecane	n-Tridecane	629-50-5	100

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#### 4. FIRST AID MEASURES


- 1) Following eye contact: Flush thoroughly with water. If irritation occurs, get medical assistance.
- 2) Following skin contact:
  - Wash contact areas with soap and water. Remove contaminated clothing.
  - Launder contaminated clothing before reuse.
- 3) Following inhalation:
  - Remove from further exposure.
  - For those providing assistance, avoid exposure to yourself or others.
  - Use adequate respiratory protection.
  - If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance.
  - If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.
- 4) Following ingestion: Seek immediate medical attention. Do not induce vomiting.
- 5) Advice to physician:
  - If ingested, material may be aspirated into the lungs and cause chemical pneumonitis.
  - Treat appropriately

#### 5. FIRE FIGHTING MEASURES

- 1) Suitable (and unsuitable) extinguishing media:
  - Suitable extinguishing media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
  - unsuitable extinguishing media: Straight streams of water
- 2) Special hazards arising from the substance or mixture:
  - Hazardous Combustion Products: Smoke, Fume, Incomplete combustion products, Oxides of carbon
  - Unusual Fire Hazards: Combustible. Hazardous material.
- 3) Special protective equipment for firefighters:
  - Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply.
  - Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA).
  - Use water spray to cool fire exposed surfaces and to protect personnel.

#### 6. ACCIDENTAL RELEASE MEASURES

- 1) Health considerations and protective equipment

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- In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.
- Avoid contact with spilled material.
- Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material

2) Environmental precautions:

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal.

Prevent entry into waterways, sewers, basements or confined areas.

3) For cleaning up

1. Land Spill:

- Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Stop leak if you can do so without risk.
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Prevent entry into waterways, sewer, basements or confined areas.
- A vapour-suppressing foam may be used to reduce vapour.
- Use clean non-sparking tools to collect absorbed material.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

2. Large Spills:

- Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.
- Recover by pumping or with suitable absorbent.

3. Water Spill:


- Stop leak if you can do so without risk.
- Warn other shipping.
- Remove from the surface by skimming or with suitable absorbents.
- Seek the advice of a specialist before using dispersants.
- Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted.

Note: Local regulations may prescribe or limit action to be taken.

## 7. HANDLING AND STORAGE

1) Precautions for safe handling:

- Avoid contact with skin.
- Prevent small spills and leakage to avoid slip hazard.
- Material can accumulate static charges which may cause an electrical spark (ignition source).

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- When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations).
- Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation.
- Consult local applicable standards for guidance.
- Loading/Unloading Temperature: [Ambient]
- Transport Temperature: [Ambient]

2) Conditions for safe storage (including any incompatibilities):

- The container choice, for example storage vessel, may effect static accumulation and dissipation.
- Keep container closed.
- Handle containers with care.
- Open slowly in order to control possible pressure release.
- Store in a cool, well-ventilated area.
- Storage containers should be earthed and bonded.
- Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.
- Storage Temperature: [Ambient]
- Storage Pressure: [Ambient]
- Suitable Containers/Packing: Tank Cars; Tank Trucks; Barges; Drums
- Suitable Materials and Coatings (Chemical Compatibility): Carbon Steel; Stainless Steel; Polyethylene; Polypropylene; Polyester; Teflon
- Unsuitable Materials and Coatings: Natural Rubber; Butyl Rubber; Polystyrene; Ethylene-propylene-diene monomer (EPDM)


## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Chemical exposure limits, Biological exposure standard:

Components	Occupational exposure limits (Domestic)	ACGIH	Biological limit values
Tridecane	No data available	No data available	No data available

2) Appropriate engineering controls:

- The level of protection and types of controls necessary will vary depending upon potential exposure conditions.
- Control measures to consider: Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

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### 3) Personal protection equipment:

#### ○ Respiratory protection:

- If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate.
- Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include: Half-face filter respirator Type A filter material, European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.
- For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode.
- Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded

#### ○ Eye protection: If contact is likely, safety glasses with side shields are recommended.

#### ○ Hand protection:


- Any specific glove information provided is based on published literature and glove manufacturer data.
- Glove suitability and breakthrough time will differ depending on the specific use conditions.
- Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions.
- Inspect and replace worn or damaged gloves.
- Chemical resistant gloves are recommended.
- Nitrile, CEN standards EN 420 and EN 374 provide general requirements and lists of glove types.

#### ○ Body protection:

- Any specific clothing information provided is based on published literature or manufacturer data.
- The types of clothing to be considered for this material include: Chemical/oil resistant clothing is recommended.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

- 1) Appearance(Physical state, color, etc): Liquid, colourless
- 2) Odour: faint
- 3) Oder threshold: No data available
- 4) pH: No data available
- 5) Melting point/freezing point: -5 at kPa

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- 6) Initial boiling point and boiling range: 226 – 233 °C
- 7) Flash point: 99 °C
- 8) Evaporation rate: No data available
- 9) Flammability(solid, gas): No data available
- 10) Upper/lower flammability or explosive limits: 2.5 / 0.6 %
- 11) Vapour pressure: 0.006 kPa at 25 °C
- 12) Solubility(ies): 0.0047 mg/L at 25 °C
- 13) Vapour density: 6.4
- 14) Relative density: 0.7564 (20 °C/ 4 °C)
- 15) n-octanol/water partition coefficient: 7.54 Log Kow
- 16) Auto ignition temperature: 202 °C at 1 atm
- 17) Decomposition temperature: No data available
- 18) Viscosity: 1.72 cSt at 40 °C
- 19) Molecular weight(mass): 184.37

## 10. STABILITY AND REACTIVITY

- 1) Stability and hazardous reactivity:
  - Material is stable under normal conditions.
- 2) Conditions to avoid:
  - Avoid heat, sparks, open flames and other ignition sources.
- 3) Incompatible materials:
  - Strong oxidisers
- 4) Hazardous decomposition products:
  - Material does not decompose at ambient temperatures.
  - HAZARDOUS POLYMERIZATION: Will not occur.


## 11. TOXICOLOGICAL INFORMATION

- 1) Exposure route information
  - Short-
- 2) Health hazard information
  - Acute toxicity:
    - Oral: Oral LD50 > 5000 mg/kg in rats (OECD TG 401)
    - Dermal Dermal LD50 > 5000 mg/kg in rabbits (OECD TG 402)
    - Inhalation LC50 > 5000 mg/m3 (OECD TG 403)
  - Skin corrosion/Irritation: Isoparaffinic, normal paraffinic, and mixed C9-C14 aliphatic, <2% aromatic hydrocarbon fluids are not corrosives or dermal irritants for rabbit (OECD TG 404).

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- Serious eye damage/irritation: No corneal damage or iridial inflammation was observed. Hyperaemia of blood vessels of the conjunctivae was seen in all animals. Ocular reactions had resolved in all instances by one day after instillation.
- Respiratory sensitization:
  - Repeated Dose Oral 90d - NOAEL  $\geq 5000$  mg/kg for rats (similar to OECD TG 408)
  - Repeated Dose Inhalation 90d - NOAEL  $\geq 10400$  mg/m<sup>3</sup> for rats (similar to OECD TG 413)
- Skin sensitization: C9-C14 aliphatic, < 2% aromatic hydrocarbons fluids were determined not to be skin sensitizers using Magnusson and Kligman Guinea-Pig Maximization tests (OECD TG 406). C9-C14 aliphatic, <2% aromatic hydrocarbons fluids were determined not to be skin sensitizers in Human Repeated Insult Patch Tests (HRIPT).
- Carcinogenicity: The available data and available weight of evidence demonstrate that the C9-C14 aliphatic, <2% aromatics are highly unlikely to be carcinogenic and are not classifiable as carcinogens.
- Germ cell mutagenicity:
  - All genetic toxicity tests listed below had negative results for C9-C14 aliphatic, <2% aromatic hydrocarbons fluids.
  - Genetic Toxicity in vitro - Bacterial reverse mutation assay (OECD TG 471)
  - Genetic Toxicity in vitro - In vitro Mammalian Chromosome Aberration Test (OECD TG 473)
  - Genetic Toxicity in vitro - In vitro Mammalian Cell Gene Mutation Test (OECD TG 476)
  - Genetic Toxicity in vitro - Genetic Toxicology: In Vitro Sister Chromatid Exchange Assay in Mammalian Cells (OECD TG 479)
- Reproductive toxicity:
  - Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test (OECD TG 422) - Oral Administration - The NOAEL for developmental toxicity was 1000 mg/kg/day and the NOAEL for reproductive toxicity was 1000 mg/kg/day.
  - Reproduction / Developmental Toxicity Screening Test (OECD TG 421) - Oral Administration - The NOAEL for developmental toxicity was 1000 mg/kg/day and the NOAEL for reproductive toxicity was 1000 mg/kg/day.
  - READ ACROSS DATA: JP-8 Fuel (C9-C16 Aliphatics, 25% aromatics)
  - One-Generation Reproduction Toxicity Study (OECD TG 415) - Male Fertility Test - Oral Administration - 90d prior to mating, the NOAEL  $\geq 3000$  mg/kg/day, which was the highest dose tested.
  - READ ACROSS DATA: C9-14 aliphatics (2-25% aromatic)
  - Reproduction / Developmental Toxicity Screening Test (OECD TG 421) - Inhalation Administration - The NOAEC for developmental toxicity was  $\geq 300$  ppm (1720mg/m<sup>3</sup>).

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- Specific target organ toxicity (single exposure):
  - Acute CNS effects: NOAEC for in rats: 1500 to 2500 mg/m<sup>3</sup> (based primarily on volatility)
  - Subchronic (13 weeks) neurotoxicity: NOAEC for rats: >24.3 g/m<sup>3</sup> (6646ppm)
- Specific target organ toxicity (repeated exposure): No data available
- Aspiration hazard: Kinematic viscosity: about 1.72 cSt at 40°C
- Other Harmful Effects: No data available

## 12. ECOLOGICAL INFORMATION

- 1) Aquatic toxicity:
  - Fish: No data available
  - Crustacean: No data available
  - Aquatic algae: No data available
- 2) Persistence and degradation:
  - Residuality: No data available
  - decomposability: No data available
- 3) Bioaccumulative potential:
  - accumulation: No data available
  - biodegradability: No data available
- 4) Mobility in soil: 2.7 mg/kg soil dw
- 5) Other adverse effects: No data available


## 13. DISPOSAL CONSIDERATIONS

- 1) Disposal methods:
  - Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.
  - Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.
- 2) Precautions (including disposal of contaminated container of package):
 

Empty Container Warning Empty Container Warning (where applicable):

  - Empty containers may contain residue and can be dangerous.
  - Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed.
  - Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations.



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- DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION.
- THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.
- Do not attempt to refill or clean containers without proper instructions.

#### 14. TRANSPORT INFORMATION

- 1) 1) UN No.: No information on classification of hazardous materials transportation
- 2) Proper shipping name: Not applicable
- 3) Class or division: Not applicable
- 4) Packing group: Not applicable
- 5) Marine pollutant: Not applicable
- 6) Special safety response for transportation or transportation measure: Not applicable

#### 15. REGULATORY INFORMATION

- 1) Occupational Safety and Health Act in Korea: Not applicable
- 2) Chemicals Control Act in Korea: Not applicable
- 3) Safety Control of Dangerous Substances Act in Korea: Class 4 Third Petroleum liquids(2000ℓ)
- 4) Wastes Control Act in Korea: Not applicable
- 5) Other regulations in KOREA and Abroad regulations:
  - Other regulation (Domestic):
    - Persistent Organic Pollutants (POPs) Control Act: Not applicable
  - National regulations:
    - U.S.A. management information(OSHA regulation): Not applicable
    - U.S.A. management information(CERCLA regulation): Not applicable
    - U.S.A. management information(EPCRA 302 regulation): Not applicable
    - U.S.A. management information(EPCRA 304 regulation): Not applicable
    - U.S.A. management information(EPCRA 313 regulation): Not applicable
    - U.S.A. management information(Rotterdam Convention on Substances): Not applicable
    - U.S.A. management information(Stockholm Convention on Substances): Not applicable
    - U.S.A. management information(Montreal Protocol on Substances): Not applicable
    - EU Classification (Classification): Asp. Cat. 1; R65
    - EU Classification (Risk Phrases): R65
    - EU Classification (Safety Phrases): S2, S23, S24, S62

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## 16. OTHER INFORMATION

### 1) Reference:

- Korea Occupational Safety & Health Agency MSDS 2017
- ChemWATCH
- IUCLID
- ECOTOX
- NITE
- Recommendations on the transport of dangerous goods
- NCIS
- Emergency response guide book
- The Chemical Database
- ICSC
- RTECS
- ESIS
- HPVIS
- ECHA CHEM

2) Print date: 2020. 04. 22

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4) Other: No data available