- MSDS Registration No. : AA01312-0000000008

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

1) Product identifier: HEAVY-LAB
2) Relevant identified uses of the substance or mixture and uses advised against:
- cleaning and cleaning agents, heat transfer agents, hydraulic oil and additives, insulation agents, Intermediate, lubricant and additives, laboratory materials
3) Manufacture/Supplier/Distributor information:
○ Manufacture information: Company name: ISU CHEMICAL CO., LTD
Address: 108-224, Sapyeongro, Nam-gu, Ulsan, Korea
Emergency telephone number: Tel. +82 52 231 5587 Fax. +82 52 231 5699

2. HAZARD IDENTIFICATION

1) Hazard classification: Skin corrosion / irritation Cat.2
Serious eye damage or eye irritants Cat.2B
2) Allocation label elements including precautionary statements
○ Hazard pictograms

○ Signal word
- Warning
○ Hazard statements
- H315: Causes skin irritation
- H320: Causes eye irritation
○ Precautionary statements
- Prevention:
· P264: Wash thoroughly after handling.
· P280: Wear protective gloves / protective clothing / eye protection / face protection.
- Response
· P302+P352: IF ON SKIN: Wash with plenty of water.
· P305+P351+P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
· P321: Give first aid.
· 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 before reuse.
- Storage: Not applicable
- Disposal: Not applicable
3) Other hazards: No data available

- MSDS Registration No. : AA01312-0000000008

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	Common name	CAS No.	Concentration wt.%	GHS classification
BENZENE, C14 30-ALKYL DERIVATIVES	C14-C30 alkyl benzene	68855-24-3 84961-70-6	95.1	-
Dodecane	N-DODECANE	112-40-3	4.7	Aspiration hazard: Cat.1
Tridecane	n-Tridecane	629-50-5	0.2	Aspiration hazard: Cat.1

4. FIRST AID MEASURES

1) Following eye contact:
   - In case of contact with material, immediately flush skin and eyes with running water for at least 20 minutes.
   - Remove contact lenses, if present and easy to do.
   - If eye irritation persists: Get medical advice/attention.
2) Following skin contact:
   - For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
   - Emergency medical service.
   - Remove and isolate contaminated clothing and shoes at the site.
   - In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
   - For minor skin contact, avoid spreading material on unaffected skin.
   - If skin irritation occurs: Get medical advice/ attention.
   - Take off contaminated clothing and wash before reuse.
3) Following inhalation:
   - Move to fresh air.
   - Give artificial respiration if victim is not breathing.
   - Administer oxygen if breathing is difficult.
   - Keep warm and stable.
4) Following ingestion:
   - Emergency medical service.
5) Advice to physician:
   - 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:

- MSDS Registration No. : AA01312-0000000008

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.

2) Special hazards arising from the substance or mixture:
- Pungent and toxic gas can be formed by thermal decomposition and combustion while burning.
- Containers may explode when heated.
- Some may burn but none ignite readily
- Applying direct water may be dangerous because fire may expand to surroundings.
- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

3) Special protective equipment for firefighters:
- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Substance may be transported in a molten form.
- Dig a hole and confine the material for not to disperse for the disposal of fire fighting water.
- 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.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment:
- Clean up spills immediately, observing precautions in Protective Equipment section.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Cover with plastic sheet to prevent spreading.
- Please note that materials and conditions to be avoided.
- Avoid breathing dust/fume/gas/mist/vapors/spray.

2) Environmental precautions:
- Prevent entry into waterways, sewers, basements or confined spaces.
- Do not discharge into the environment.

- MSDS Registration No. : AA01312-0000000008

3) For cleaning up:
- Absorb the liquid and scrub the area with detergent and water.
- Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.

7. HANDLING AND STORAGE

1) Precautions for safe handling:
- Use care in handling/storage.
- Follow all MSDS/label precautions even after container is emptied because they may product residues
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- Please note that materials and conditions to be avoided.
- Handling refer to engineering control/personal protection section.
- Avoid breathing dust/fume/gas/mist/vapors/spray.
- Wash thoroughly after handling.
- Use only outdoors or in a well-ventilated area.

2) Conditions for safe storage (including any incompatibilities):
- Empty drums should be completely drained, properly bunged, and promptly returned to the drum reconditioners or properly placed.
- Store in a well-ventilated place. Keep container tightly closed.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Chemical exposure limits, Biological exposure standard:

Components	Occupational exposure limits (Domestic)	ACGIH	Biological limit values
BENZENE, C14-30 -ALKYL DERIVATIVES	No data available	No data available	Not applicable
Dodecane	No data available	No data available	Not applicable
Tridecane	No data available	No data available	Not applicable

2) Appropriate engineering controls:
- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- Use explosion-proof electrical equipment in the handling area.
- When mist generates during operation, ventilate to maintain the air pollution below exposure limit.

- MSDS Registration No. : AA01312-0000000008

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Take precautionary measures against static discharge.

3) Personal protection equipment:

○ Respiratory protection:
- Wear a NIOSH/OSHA approved respirator.

○ Eye protection:
- Wear appropriate goggles type safety glasses to protect eyes from scattering dust or hazardous liquid.

○ Hand protection:
- Wear suitable protective gloves.

○ Body protection:
- Wear suitable protective clothing.
- To prevent any contact with this product, wear appropriate gloves, apron, boots or impermeable protective equipment (e.g. whole suit) if necessary.

9. PHYSICAL AND CHEMICAL PROPERTIES

1) Appearance(Physical state, color, etc): Liquid
2) Oder: No data available
3) Odor threshold: No data available
4) pH: No data available
5) Melting point/freezing point: -48~-50℃
6) Initial boiling point and boiling range: 340~394℃
7) Flash point: 191℃
8) Evaporation rate: No data available
9) Flammability(solid, gas): Not applicable
10) Upper/lower flammability or explosive limits: No data available
11) Vapour pressure: 0.0000238 (at 25C, Estimate)
12) Solubility(ies): 0.004~0.021 mg/L in water
13) Vapour density: No data available
14) Relative density: 0.8708 @ 15/4℃
15) n-octanol/water partition coefficient: 8.9246
16) Auto ignition temperature: No data available
17) Decomposition temperature: No data available
18) Viscosity: 20.90 cSt at 40℃
19) Molecular weight(mass): No data available

10. STABILITY AND REACTIVITY

1) Stability and hazardous reactivity:

● MSDS Registration No. : AA01312-0000000008

- Stable under normal temperatures and pressures.
- Containers may explode when heated.
- Some may burn but none ignite readily.
- Fire may produce irritating, corrosive and/or toxic gases.
- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

2) Conditions to avoid:
- Ignition source(heat, spark, flame)

3) compatible materials:
- Oxidizers
- Combustibles, reducing material

4) Hazardous decomposition products:
- Pungent and toxic gas can be formed by thermal decomposition and combustion while burning.

11. TOXICOLOGICAL INFORMATION

1) Exposure route information
○ No data available

2) Health hazard information
○ Acute toxicity:
- Oral: LD50 > 15,800 mg/kg (Rat, Sprague-Dawley)
- Dermal: LD50 > 7,940 mg/kg (Rabbit, New Zealand)
- Inhalation(Gas): No data available
- Inhalation(Vapor): LD50 = 71 mg/L (Rat, Holtzman)
- Inhalation(Dust, mist): No data available

○ Skin corrosion/Irritation: Moderate irritation (Rabbit, OECD TG 404, GLP)
○ Serious eye damage/irritation: Mild irritability (Rabbit, OECD TG 405, GLP)
○ Respiratory sensitization: Not sensitising (Human)
○ Skin sensitization: Not sensitising (Guinea pig, OECD TG 406, GLP)
○ Carcinogenicity: No data available
○ Germ cell mutagenicity:
- In vivo – Rat: Negative (Chromosome aberration test)
- In vitro – Salmonella typhimurium: Negative (Bacterial reverse mutation assays, Metabolic activation: with and without)

○ Reproductive toxicity: No reproductive effects observed. (Rat)
○ Specific target organ toxicity (single exposure): No clinical signs of toxicity were observed. (Rat)
○ Specific target organ toxicity (repeated exposure):
There was no mortality, and no treatment related clinical signs observed during the study. (Rat, GLP)
○ Aspiration hazard: Not applicable

- MSDS Registration No. : AA01312-0000000008

○ Other Hazardous Effects : No data available

12. ECOLOGICAL INFORMATION

1) Aquatic toxicity:
   - Fish: No impact observed(Pimphales promelas, 96Hr)
   - Custacean: No impact observed(Daphnia magna, 48Hr)
   - Aquatic algae: No impact observed(Selenastrum capricornutum, 96Hr)
2) Persistence and degradation:
   - Persistence : log Know = 8.9246
   - Degradation : 56~61%(35d, CO2)
3) Bioaccumulative potential: BCF = 35
4) Mobility in soil: No data available
5) Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS

1) Disposal methods:
   - Dispose of contents and containers in accordance with the regulations, if specified in the Waste Control Act.
2) Precautions (including disposal of contaminated container of package):
   - Dispose of the contents container (in accordance with the relevant laws and regulations).

14. TRANSPORT INFORMATION

1) UN No.: Not applicable
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(Non-aqueous) 2000L
4) Wastes Control Act in Korea: Not applicable
5) Other regulations in KOREA and Abroad regulations:

- MSDS Registration No. : AA01312-0000000008

• 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(Mont- real Protocol on Substances): Not applicable
  - EU Classification (Classification): Not applicable
  - EU Classification (Risk Phrases): Not applicable
  - EU Classification (Safety Phrases): Not applicable
  - The German Water hazard classes(WGK):1(low hazard to waters)

16. OTHER INFORMATION

1) Reference:
- Korea Occupational Safety & Health Agency MSDS
- OECD SIDS
- ChemWATCH
- IUCLID
- HSDB
- IARC
- ECOTOX
- Recommendations on the transport of dangerous goods
- NCIS
- Emergency response guide book
- ECOSAR
- QSAR
- EU RAR
- The Chemical Database
- ICSC
- RTECS
- NIOSH Pocket guide
- ESIS
- ECHA CHEM
- HPVIS

2) Creation Date: 1996. 07. 26

- MSDS Registration No. : AA01312-0000000008

3) Number of revised/Date of last revision: 13 / 2022. 02. 04

4) Other: No data available