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

- 1) Product identifier: TDM
- 2) Relevant identified uses of the substance or mixture and uses advised against: Reaction intermediate.
- 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: Skin corrosion/irritation Cat.2  
 Skin sensitization Cat.1B  
 Hazards to the aquatic environment, acute toxicity Cat.1  
 Hazards to the aquatic environment, chronic toxicity Cat.1
- 2) Allocation label elements including precautionary statements
  - Hazard pictograms
 



  - Signal word
    - Warning
  - Hazard statements
    - H315: Causes skin irritation.
    - H317: May cause an allergic skin reaction.
    - H400: Very toxic to aquatic life
    - H410: Very toxic to aquatic life with long-lasting effects
  - Precautionary statements
    - Prevention
      - P261: Avoid breathing mist/vapours/spray.
      - P264: Wash the handling area thoroughly after handling
      - P272: Contaminated work clothing should not be allowed out of the workplace.
      - P273: Avoid release to the environment.
      - P280: Wear protective gloves/protective clothing/eye protection/face protection.
    - Response
      - P302+P352: IF ON SKIN: Wash with plenty of soap and water.
      - P321: Specific treatment (See item 4 on this label.)
      - P332+P313: If skin irritation occurs: Get medical advice/attention.
      - P333+P313: If skin irritation or rash occurs: Get medical advice/attention.

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- P362+P364: Take off contaminated clothing and wash it before reuse.
  - P391: Collect spillage.
    - Storage: No data available
    - Disposal
  - P501: Dispose of contents and container.(as specified in applicable regulations)
- 3) Other hazards:
- NFPA Grade: Health 2, Flammability 1, Reactivity 0

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	Common name	CAS No.	Concentration(wt%)
Tert-Dodecanethiol(TDM)	Tert-Dodecyl mercaptan	25103-58-6	100

### 4. FIRST AID MEASURES

- 1) Following eye contact:
  - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - If eye irritation persists: Get medical advice/attention.
- 2) Following skin contact:
  - If skin irritation develops, get medical attention.
  - Take off contaminated clothing and wash before reuse.
  - Call 911 or emergency medical service.
  - Remove and isolate contaminated clothing and shoes.
  - In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
  - In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
  - Wash skin with soap and water.
- 3) Following inhalation:
  - Move victim to fresh air.
  - Seek immediate medical assistance.
  - Give artificial respiration if victim is not breathing.
  - Administer oxygen if breathing is difficult.
- 4) Following ingestion:
  - Seek immediate medical assistance.
- 5) Advice to physician:
  - Effects of contact or inhalation may be delayed.
  - Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

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## 5. FIRE FIGHTING MEASURES

- 1) Suitable (and unsuitable) extinguishing media:
  - Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
  - Use dry sand or earth to smother fire.
  - Direct water (Unsuitable extinguishing media)
- 2) Special hazards arising from the substance or mixture:
  - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
  - On combustion, may emit toxic fumes of carbon monoxide (CO)
  - Inhalation or contact with material may irritate or burn skin and eyes.
  - May cause toxic effects if inhaled or absorbed through skin.
- 3) Special protective equipment for firefighters:
  - Rescuers should put on appropriate protective gear.
  - Evacuate area and fight fire from a safe distance.
  - 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:
  - Do not breathe dust/fume/gas/mist/vapours/spray.
  - Clean up spills immediately, observing precautions in Protective Equipment section.
  - Do not touch or walk through spilled material.
  - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
  - All equipment used when handling the product must be grounded.
  - Stop leak if you can do it without risk.
  - A vapor suppressing foam may be used to reduce vapors.
  - Please note that materials and conditions to be avoided.
- 2) Environmental precautions:
  - Avoid release to the environment.

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- Runoff may cause pollution.
  - Prevent entry into waterways, sewers, basements of confined areas.
- 3) For cleaning up:
- Absorb the liquid and scrub the area with detergent and water.
  - Use clean non-sparking tools to collect absorbed material.
  - Stir calcium hypochlorite to reduce odor rapidly.
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Dispose of the material collected according to regulations.

## 7. HANDLING AND STORAGE


- 1) Precautions for safe handling:
- Wash the handling area thoroughly after handling.
  - Contaminated work clothing should not be allowed out of the workplace.
  - Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
  - Avoid prolonged or repeated contact with skin.
  - All equipment used when handling the product must be grounded.
  - Please note that materials and conditions to be avoided.
  - Handling refer to engineering control/personal protection section.
- 2) Conditions for safe storage (including any incompatibilities):
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
  - Please note that materials and conditions to be avoided.
  - Keep container tightly sealed.
  - Store in a dry place. Store in a closed container.

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

- 1) Chemical exposure limits, Biological exposure standard:

Components	Occupational exposure limits (Domestic)	ACGIH	Biological limit values
Tert-Dodecanethiol (TDM)	No data available	No data available	No data available

- 2) Appropriate engineering controls:
- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- 3) Personal protection equipment
- Respiratory protection:


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- Respiratory protections are needed when concentration is unknown or other life or health is in urgent danger.
- Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.
- For gas / liquid substances the following respiratory protection is recommended:  
Isolated full face gas mask (for organic compounds (if acid gas, acid gas)) or Isolation type half-gas mask (for organic compound (for acid gas, acid gas)) or Direct type full face gas mask (for organic compounds (for acid gas, for acid gas)) Or The half-gas mask (for organic compounds (for acid gas, for acid gas)) or Electric Gas Mask
- In case of lack of oxygen (<19.5%), wear breathing mask or self-contained breathing apparatus.
- Eye protection:
  - Provide emergency showers and eyewash.
  - Wear suitable protective goggles and face shields.
- Hand protection:
  - Wear insulated gloves.
  - Wear suitable protective gloves.
- Body protection:
  - Wear suitable protective clothing.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

- 1) Appearance(Physical state, color, etc): Colorless liquid
- 2) Odor: Repulsive odor
- 3) Odor threshold: No data available
- 4) pH: Not applicable
- 5) Melting point/freezing point: < -20℃
- 6) Initial boiling point and boiling range: 231-239 ℃
- 7) Flash point: 95℃
- 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: 20 Pa at 25℃
- 12) Solubility(ies): 3.93 µg/L at 20℃
- 13) Vapour density: No data available
- 14) Relative density: 0.8634 @ 15/4℃
- 15) n-octanol/water partition coefficient: 6.07
- 16) Auto ignition temperature: 212℃
- 17) Decomposition temperature: No data available
- 18) Viscosity: 3.77 mm<sup>2</sup>/s at 20℃
- 19) Molecular weight(mass): 197-205

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## 10. STABILITY AND REACTIVITY

- 1) Stability and hazardous reactivity:
  - Some may burn but none ignite readily.
  - Fire may produce irritating, corrosive and/or toxic gases.
  - Inhalation or contact with material may irritate or burn skin and eyes.
  - May cause toxic effects if inhaled or absorbed through skin.
- 2) Conditions to avoid:
  - Ignition source (heat, spark, flame, etc.)
- 3) Incompatible materials:
  - No data available
- 4) Hazardous decomposition products:
  - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
  - Decomposition may produce H<sub>2</sub>S, CO.

## 11. TOXICOLOGICAL INFORMATION

- 1) Exposure route information
  - No data available
- 2) Health hazard information
  - Acute toxicity:
    - Oral: LD<sub>50</sub> ≥ 2,000 mg/kg (Rat, OECD TG 423, 2017)
    - Dermal: LD<sub>50</sub> ≥ 12,600 mg/kg (Rat, OECD TG 402, 1961)
    - Inhalation(Vapor): No data available
    - Inhalation(mist): No data available
  - Skin corrosion/Irritation:
    - Irritating (Rabbit, OECD TG 404, GLP)
  - Serious eye damage/irritation:
    - Not Classified (Rabbit, OECD TG 437, GLP)
  - Respiratory sensitization:
    - No data available
  - Skin sensitization:
    - Sensitizing (Mouse, OECD TG 429, GLP)
  - Carcinogenicity:
    - No data available
  - Germ cell mutagenicity:
    - In vivo -Negative (Micronucleus assay, OECD TG 474, GLP)
    - In vitro -Negative (Ames test, OECD TG 471, 1992)
    - *Mouse lymphoma cells*: Negative (Mammalian Cell Gene Mutation Test, OECD

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TG 476, Metabolic activation: with and without)

- Reproductive toxicity:
  - No significant effects on mother and fetus were observed in rats in developmental toxicity tests by inhalation exposure (Rat, OECD TG 414, 1983). NOAEC >= 55ppm(6.07mg/l)
- Specific target organ toxicity (single exposure):
  - No data available
- Specific target organ toxicity (repeated exposure):
  - Decreased food intake and decreased exercise activity were observed in repeated 90-day inhalation exposure using rats, but cannot be classified because they are not significant effects. (Rat, OECD TG 413, 2017)
- Aspiration hazard:
  - No data available

## 12. ECOLOGICAL INFORMATION


- 1) Aquatic toxicity:
  - Fish: 0.377 mg/L (Oryzias latipes, OECD TG 203, 96h)
  - Crustacean(Acute): EC50 = 0.0746 mg/L (Daphnia magna, OECD TG 202, 48h)  
NOECi = 0.0556 mg/L (Daphnia magna, OECD TG 202, 24h)
  - Aquatic algae: EbC50 = 33.3 mg/L (Selenastrum capricornutum, OECD TG 202, 72h)  
NOECb = 33.3 mg/L (Selenastrum capricornutum, OECD TG 202, 72h)
  - Crustacean(Chronic): LC50 = 0.0432 mg/L (Daphnia magna, OECD TG 211, 21d)  
EC50 = 0.0204 mg/L (Daphnia magna, OECD TG 211, 21d)  
LOEC0 = 0.0256 mg/L (Daphnia magna, OECD TG 211, 21d)
- 2) Persistence and degradation: log Kow > 6.2, BOD= 81.9% (14d)
- 3) Bioaccumulative potential: BCF = 1,046~1,570 L/kg
- 4) Mobility in soil: log Koc = 6.07
- 5) ozone layer harmfulness :Not applicable
- 6) Other adverse effects: No data available

## 13. DISPOSAL CONSIDERATIONS

- 1) Disposal methods:
  - Dispose of contents/container to the waste control act.
- 2) Precautions (including disposal of contaminated container of package):
  - Regulations precautions indicated in Waste Management Act should be considered.

## 14. TRANSPORT INFORMATION

- 1) UN No.: 3082

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- 2) Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S
- 3) Class or division: 9(P)
- 4) Packing group: 3
- 5) Marine pollutant: Applicable
- 6) Special safety response for transportation or transportation measure:
  - Emergency measures in case of fire : : F-E
  - Emergency measures in case of Outflow : S-D


## 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
- 4) Wastes Control Act in Korea: Designated waste
- 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(Mont- real Protocol on Substances): Not applicable
    - EU Classification (Classification): Not applicable
    - EU Classification (Risk Phrases): Not applicable
    - EU Classification (Safety Phrases): Not applicable

## 16. OTHER INFORMATION

- 1) Reference:
  - Korea Occupational Safety & Health Agency MSDS
  - IMDG Code
  - OECD SIDS
  - ChemWATCH
  - IUCLID
  - HSDB



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<ul style="list-style-type: none"> <li>• IARC</li> <li>• ECOTOX</li> <li>• NITE</li> <li>• Recommendations on the transport of dangerous goods</li> <li>• NCIS</li> <li>• Emergency response guide book</li> <li>• ECOSAR</li> <li>• QSAR</li> <li>• EU RAR</li> <li>• The Chemical Database</li> <li>• ICSC</li> <li>• RTECS</li> <li>• NIOSH Pocket guide</li> <li>• ESIS</li> <li>• ECHA CHEM</li> <li>• HPVIS</li> </ul> <p>2) Date of initial completion: 2011. 01. 21</p> <p>3) Number of revised/Date of last revision: 6 / 2022. 02. 28</p> <p>4) Other: No data available</p>
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