1 Identification

- Product identifier
- Trade name: Terbinafine (hydrochloride)
- Article number: 10011619
- CAS Number: 78628-80-5
- EC number: 616-640-4
- Application of the substance / the mixture
  This product is for research use - Not for human or veterinary diagnostic or therapeutic use. It is the responsibility of the purchaser to determine suitability for other applications.

Details of the supplier of the safety data sheet
- Manufacturer/Supplier: Cayman Chemical Co.
  1180 E. Ellsworth Rd.
  Ann Arbor, MI 48108
  USA
- Information department: Product safety department
- Emergency telephone number:
  During normal opening times: +1 (734) 971-3335
  US/CANADA: 800-424-9300
  Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

- Classification of the substance or mixture
  GHS09 Environment
  Aquatic Acute 1  H400 Very toxic to aquatic life.
  Aquatic Chronic 1  H410 Very toxic to aquatic life with long lasting effects.

  GHS07
  Skin Irrit. 2  H315 Causes skin irritation.
  Eye Irrit. 2A  H319 Causes serious eye irritation.
  STOT SE 3  H335 May cause respiratory irritation.

(Contd. on page 2)
Trade name: Terbinafine (hydrochloride)

Label elements
- GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
- Hazard pictograms
  ![GHS07](image)
  ![GHS09](image)

Signal word Warning
Hazard statements
- H315 Causes skin irritation.
- H319 Causes serious eye irritation.
- H335 May cause respiratory irritation.
- H400 Very toxic to aquatic life.
- H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements
- P261 Avoid breathing dust/fume/gas/mist/vapors/spray
- P264 Wash thoroughly after handling.
- P271 Use only outdoors or in a well-ventilated area.
- P273 Avoid release to the environment.
- P280 Wear protective gloves / eye protection / face protection.
- P302+P352 If on skin: Wash with plenty of water.
- P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P312 Call a poison center/doctor if you feel unwell.
- P321 Specific treatment (see on this label).
- P362+P364 Take off contaminated clothing and wash it before reuse.
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P391 Collect spillage.
- P403+P433 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.
- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:
- NFPA ratings (scale 0 - 4)
  ![NFPA](image)
  Health = 2
  Fire = 0
  Reactivity = 0

- HMIS-ratings (scale 0 - 4)
  ![HMIS](image)
  Health = 2
  Fire = 0
  Reactivity = 0

Other hazards
- Results of PBT and vPvB assessment
- PBT: Not applicable.
Trade name: Terbinafine (hydrochloride)

- vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
  78628-80-5 Terbinafine (hydrochloride)
- Identification number(s)
  - EC number: 616-640-4

4 First-aid measures

- Description of first aid measures
  - After inhalation: In case of unconsciousness place patient stably in side position for transportation.
  - After skin contact: Immediately wash with water and soap and rinse thoroughly.
  - After eye contact:
    Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
  - After swallowing: If symptoms persist consult doctor.
- Information for doctor:
  - Most important symptoms and effects, both acute and delayed
    May cause anemia, cough, CNS depression, drowsiness, headache, heart damage, lassitude
    (weakness, exhaustion), liver damage, narcosis, reproductive effects, teratogenic effects.
  - Indication of any immediate medical attention and special treatment needed
    No further relevant information available.

5 Fire-fighting measures

- Extinguishing media
  - Suitable extinguishing agents:
    Use fire fighting measures that suit the environment.
    A solid water stream may be inefficient.
  - Special hazards arising from the substance or mixture
    No further relevant information available.
- Advice for firefighters
  - Protective equipment: No special measures required.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Not required.
- Environmental precautions:
  Inform respective authorities in case of seepage into water course or sewage system.
  Do not allow to enter sewers/ surface or ground water.
- Methods and material for containment and cleaning up:
  Ensure adequate ventilation.
- Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.
- Protective Action Criteria for Chemicals
  - PAC-1: Substance is not listed.
  - PAC-2: Substance is not listed.
7 Handling and storage

- Handling:
  - Precautions for safe handling
    No special precautions are necessary if used correctly.
    Avoid breathing dust/fume/gas/mist/vapours/spray.
    Avoid prolonged or repeated exposure.
    Keep away from sources of ignition.
    Take precautionary measures against static discharge.
  - Information about protection against explosions and fires: No special measures required.

- Conditions for safe storage, including any incompatibilities
  - Storage:
    - Requirements to be met by storerooms and receptacles: No special requirements.
    - Information about storage in one common storage facility: Not required.
    - Further information about storage conditions: Keep receptacle tightly sealed.
  - Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters
- Components with limit values that require monitoring at the workplace: Not required.
- Additional information: The lists that were valid during the creation were used as basis.

- Exposure controls
  - Personal protective equipment:
    - General protective and hygienic measures:
      Keep away from foodstuffs, beverages and feed.
      Immediately remove all soiled and contaminated clothing.
      Wash hands before breaks and at the end of work.
      Avoid contact with the eyes and skin.
  - Breathing equipment:
    In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
  - Protection of hands:

    Protective gloves

    The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
    Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
  - Material of gloves
    The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
Trade name: Terbinafine (hydrochloride)

- **Penetration time of glove material**
  The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

- **Eye protection:**
  Tightly sealed goggles

### 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Information on basic physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Information</strong></td>
</tr>
<tr>
<td><strong>Appearance:</strong></td>
</tr>
<tr>
<td>Form: Solid</td>
</tr>
<tr>
<td>Color: Not determined.</td>
</tr>
<tr>
<td>Odor: Characteristic</td>
</tr>
</tbody>
</table>

| Structural Formula                                  |
| C21H25N · HCl                                       |

| Molecular Weight                                    |
| 327.9 g/mol                                         |

| Odor threshold:                                     |
| Not determined.                                     |

| pH-value:                                           |
| Not applicable.                                    |

| Change in condition                                 |
| Melting point/Melting range: Undetermined.          |
| Boiling point/Boiling range: Undetermined.          |

| Flash point:                                        |
| Not applicable.                                    |

| Flammability (solid, gaseous): Product is not flammable. |
| Decomposition temperature: Not determined.            |

| Auto igniting:                                       |
| Not determined.                                     |

| Danger of explosion:                                 |
| Product does not present an explosion hazard.        |

| Explosion limits:                                   |
| Lower: Not determined.                               |
| Upper: Not determined.                               |

| Vapor pressure:                                     |
| Not applicable.                                     |

| Density:                                            |
| Not determined.                                     |

| Relative density                                    |
| Not determined.                                     |

| Vapor density                                       |
| Not applicable.                                     |

| Evaporation rate                                    |
| Not applicable.                                     |

| Solubility in / Miscibility with Water: Not determined. |

| Partition coefficient (n-octanol/water): Not determined. |

| Viscosity:                                           |
| Dynamic: Not applicable.                             |
| Kinematic: Not applicable.                           |
Safety Data Sheet
acc. to OSHA HCS

Printing date 08/04/2021
Revision date 08/04/2021

Trade name: Terbinafine (hydrochloride)

(Contd. from page 5)

<table>
<thead>
<tr>
<th>SOLUBILITY</th>
<th>DMF: 14 mg/ml, DMSO: 12.5 mg/ml, Ethanol: 30 mg/ml, Ethanol:PBS (pH 7.2)(1:2): 0.3 mg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Other information</td>
<td>No further relevant information available.</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

· Reactivity No further relevant information available.
· Chemical stability
· Thermal decomposition / conditions to be avoided:
  No decomposition if used according to specifications.
· Possibility of hazardous reactions No dangerous reactions known.
· Conditions to avoid No further relevant information available.
· Incompatible materials: strong oxidizing agents
· Hazardous decomposition products:
  carbon dioxide, carbon monoxide, hydrogen chloride gas, nitrogen oxides

11 Toxicological information

· RTECS Number QJ8600100
· Information on toxicological effects
  · Acute toxicity:
    · LD/LC50 values that are relevant for classification:
      | Oral  | TDLO               | Subcutaneous LD50 |
      |       | 210 ml/kg/6W intermittent (wmn) | >2 g/kg (rat) |
  · Primary irritant effect:
    · on the skin: Irritant to skin and mucous membranes.
    · on the eye: Irritating effect.
    · Sensitization: No sensitizing effects known.
· Additional toxicological information:
  · Carcinogenic categories
    · IARC (International Agency for Research on Cancer) Substance is not listed.
    · NTP (National Toxicology Program) Substance is not listed.
    · OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

12 Ecological information

· Toxicity
  · Aquatic toxicity: No further relevant information available.
  · Persistence and degradability No further relevant information available.
· Behavior in environmental systems:
  · Bioaccumulative potential No further relevant information available.
  · Mobility in soil No further relevant information available.
· Ecotoxicological effects:
  · Remark: Very toxic for fish
· Additional ecological information:
  · General notes:
    Water hazard class 2 (Self-assessment): hazardous for water
    Do not allow product to reach ground water, water course or sewage system.

(Contd. on page 7)
Trade name: Terbinafine (hydrochloride)

- Danger to drinking water if even small quantities leak into the ground.
- Also poisonous for fish and plankton in water bodies.
- Very toxic for aquatic organisms

- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.
  - Other adverse effects: No further relevant information available.

13 Disposal considerations

- Waste treatment methods
  - Recommendation: Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- Uncleaned packagings:
  - Recommendation: Disposal must be made according to official regulations.

14 Transport information

- UN-Number
  - DOT: not regulated
  - IMDG, IATA: UN3077

- UN proper shipping name
  - DOT: not regulated
  - IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Terbinafine (hydrochloride))
  - IATA: Environmentally hazardous substance, solid, n.o.s. (Terbinafine (hydrochloride))

- Transport hazard class(es)
  - DOT: Class not regulated
  - IMDG: Class 9 Miscellaneous dangerous substances and articles
  - IATA: Class 9 Miscellaneous dangerous substances and articles

(Contd. on page 8)
Trade name: Terbinafine (hydrochloride)

- Packing group
  - DOT: not regulated
  - IMDG, IATA: III

- Environmental hazards:
  - Special marking (IATA): Symbol (fish and tree)

- Special precautions for user
  - Warning: Miscellaneous dangerous substances and articles

- Hazard identification number (Kemler code): 90
- EMS Number: F-A,S-F
- Stowage Category: A
- Stowage Code: SW23 When transported in BK3 bulk container, see 7.6.2.12 and 7.7.3.9.

- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

- Transport/Additional information:
  - IMDG
    - Limited quantities (LQ): 5 kg
    - Excepted quantities (EQ): Code: E1
      - Maximum net quantity per inner packaging: 30 g
      - Maximum net quantity per outer packaging: 1000 g
  - IATA
    - Remarks: When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.

- UN "Model Regulation": UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (TERBINAFINE (HYDROCHLORIDE)), 9, III

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  - No further relevant information available.
- Sara
- Section 355 (extremely hazardous substances): Substance is not listed.
- Section 313 (Specific toxic chemical listings): Substance is not listed.
- TSCA (Toxic Substances Control Act): Substance is not listed.
- Hazardous Air Pollutants Substance is not listed.
- Proposition 65
- Chemicals known to cause cancer: Substance is not listed.
- Chemicals known to cause reproductive toxicity for females: Substance is not listed.
- Chemicals known to cause reproductive toxicity for males: Substance is not listed.
- Chemicals known to cause developmental toxicity: Substance is not listed.
- Carcinogenic categories
- EPA (Environmental Protection Agency) Substance is not listed.
Trade name: Terbinafine (hydrochloride)

- TLV (Threshold Limit Value) Substance is not listed.
- NIOSH-Ca (National Institute for Occupational Safety and Health) Substance is not listed.
- Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

All chemicals may pose unknown hazards and should be used with caution. This SDS applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of these data. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

- Department issuing SDS: Environment protection department.
- Contact: -
- Date of preparation / last revision 08/04/2021 / -
- Abbreviations and acronyms:
  - IMDG: International Maritime Code for Dangerous Goods
  - DOT: US Department of Transportation
  - IATA: International Air Transport Association
  - EINECS: European Inventory of Existing Commercial Chemical Substances
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - NFPA: National Fire Protection Association (USA)
  - HMIS: Hazardous Materials Identification System (USA)
  - LC50: Lethal concentration, 50 percent
  - LD50: Lethal dose, 50 percent
  - PBT: Persistent, Bioaccumulative and Toxic
  - vPvB: very Persistent and very Bioaccumulative
  - NIOSH: National Institute for Occupational Safety
  - OSHA: Occupational Safety & Health
  - TLV: Threshold Limit Value
  - PEL: Permissible Exposure Limit
  - REL: Recommended Exposure Limit
  - Skin Irrit. 2: Skin corrosion/irritation – Category 2
  - Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
  - STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
  - Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
  - Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1

- * Data compared to the previous version altered.