SAFETY DATA SHEET
Tamoxifen

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Code: 13258
Product Name: Tamoxifen
Synonyms: 2-[4-[(1Z)-1,2-diphenyl-1-buten-1-yl]phenoxy]-N,N-dimethyl-ethanamine;

1.2 Relevant identified uses of the substance or mixture and uses advised against:
Relevant identified uses: For research use only, not for human or veterinary use.

1.3 Details of the Supplier of the Safety Data Sheet:
Company Name: Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108
Web site address: www.caymanchem.com
Information: Cayman Chemical Company +1 (734)971-3335

1.4 Emergency telephone number:
Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
CHEMTREC Outside USA and Canada: +1 (703)527-3887

Section 2. Hazards Identification

2.1 Classification of the Substance or Mixture:
2.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP]:
Carcinogenicity, Category 1B
Toxic To Reproduction, Category 1B
Toxic To Reproduction, Effects on or via lactation
Acute Toxicity: Oral, Category 4

2.1.2 Classification according to Directive 1999/45/EC:
T: Toxic
Carcinogenic Hazard: 2
Reproductive Hazard: 2
Risk Phrases: R22, R45, R60, R61, R64
For full text of R-phrases: see SECTION 15.

2.2 Label Elements:
2.2.1 Labeling according to Regulation (EC) No 1272/2008 [CLP]:

GHS Signal Word: Danger
GHS Hazard Phrases:
H350: May cause cancer.
H360: May damage fertility or the unborn child.
H362: May cause harm to breast-fed children.
H302: Harmful if swallowed.

GHS Precaution Phrases:
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.
P263: Avoid contact during pregnancy/while nursing.
P264: Wash {hands} thoroughly after handling.
P260: Do not breathe {dust/fume/gas/mist/vapours/spray}.

GHS Response Phrases:
Tamoxifen

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11/25/2013 Supersedes Revision:

P308+313: IF exposed or concerned: Get medical attention/advice.
P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330: Rinse mouth.

GHS Storage and Disposal Phrases:
Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.2.2 Labeling according to Directive 1999/45/EC:

Carcinogenic Hazard: 2; Reproductive Hazard: 2

2.3 Adverse Human Health Harmful if swallowed.

Effects and Symptoms: Material may be irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation or skin absorption.
May cause cancer.
May cause eye, skin, or respiratory system irritation.
May cause harm to breast-fed children.
May damage fertility or the unborn child.
Presumed human reproductive toxicant.
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>CAS # / RTECS #</th>
<th>Hazardous Components (Chemical Name) / REACH Registration No.</th>
<th>Concentration</th>
<th>EC No./ EC Index No.</th>
<th>Risk Phrases / GHS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>10540-29-1</td>
<td>Tamoxifen</td>
<td>100.0 %</td>
<td>234-118-0 NA</td>
<td>T; Ca:2, Rp:2, R22-45-60-61-64</td>
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<tr>
<td>KR5919600</td>
<td></td>
<td></td>
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<td>Acute Tox.(O) 4: H302</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Carcinogen 1B: H350</td>
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<td>Toxic Repro. 1B: H360</td>
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<td>Toxic Lactate: H362</td>
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</table>

Section 4. First Aid Measures

4.1 Description of First Aid: No data available.

Measures:
In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.

In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media: Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray. Use water spray to cool fire-exposed containers. A solid water stream may be inefficient.

5.2 Flammable Properties and Hazards: No data available.

Flash Pt: No data.
Explosive Limits: LEL: No data. UEL: No data.
Autoignition Pt: No data.

5.3 Fire Fighting Instructions: As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

6.1 Protective Precautions, Protective Equipment and Emergency Procedures: Avoid raising and breathing dust, and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).

6.2 Environmental Precautions: Take steps to avoid release into the environment, if safe to do so.

6.3 Methods and Material For Containment and Cleaning Up: Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

7.1 Precautions To Be Taken in Handling: Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.

7.2 Precautions To Be Taken in Storing: Keep container tightly closed. Store in accordance with information listed on the product insert.

Other Precautions: Light sensitive.

Section 8. Exposure Controls/Personal Protection

8.1 Exposure Parameters:

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Partial Chemical Name</th>
<th>Britain EH40</th>
<th>France VL</th>
<th>Europe</th>
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<tbody>
<tr>
<td>10540-29-1</td>
<td>Tamoxifen</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
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</table>

CAS #   | Partial Chemical Name | OSHA TWA | ACGIH TWA | Other Limits |
<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>Tamoxifen</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
</tbody>
</table>

8.2 Exposure Controls:

8.2.1 Engineering Controls (Ventilation etc.): Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

8.2.2 Personal protection equipment:

Eye Protection: Safety glasses
Protective Gloves: Compatible chemical-resistant gloves
Other Protective Clothing: Lab coat
Respiratory Equipment: NIOSH approved respirator, as conditions warrant.
Work/Hygienic/Maintenance: Do not take internally.
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States: [ ] Gas [ ] Liquid [ X ] Solid
Appearance and Odor: A crystalline solid
Melting Point: No data.
Boiling Point: No data.
Flash Pt: No data.
Evaporation Rate: No data.
Explosive Limits: LEL: No data. UEL: No data.
Vapor Pressure (vs. Air or mm Hg): No data.
Vapor Density (vs. Air = 1): No data.
Specific Gravity (Water = 1): No data.
Solubility in Water: No data.
Solubility Notes: ~0.3 mg/ml in 1:2 EtOH:PBS (pH 7.2); ~20 mg/ml in EtOH & DMF; ~2 mg/ml in DMSO;
Autoignition Pt: No data.

9.2 Other Information

Percent Volatile: No data.
Molecular Formula & Weight: $\text{C}_{26}\text{H}_{29}\text{NO}$ 371.5

Section 10. Stability and Reactivity

10.1 Reactivity: No data available.
10.2 Stability: Unstable [ ] Stable [ X ]
10.3 Stability Note(s): Stable if stored in accordance with information listed on the product insert.
Polymerization: Will occur [ ] Will not occur [ X ]
10.4 Conditions To Avoid: No data available.
10.5 Incompatibility - Materials To Avoid: strong oxidizing agents
10.6 Hazardous Decomposition Or Byproducts: carbon dioxide carbon monoxide nitrogen oxides
Section 11. Toxicological Information

11.1 Information on Toxicological Effects: The toxicological effects of this product have not been thoroughly studied.

- Tamoxifen - Toxicity Data:
  - Oral TDLO (woman): 5600 ug/kg/1W (intermittent)
  - Oral LD50 (rat): 4,100 mg/kg
  - Intraperitoneal LD50 (rat): 700 mg/kg
  - Oral LD50 (mouse): 2,150 mg/kg
  - Intraperitoneal LD50 (mouse): 50 mg/kg
  - Intraperitoneal TDLO (rat): 100 µg/kg
  - Oral TDLO (rat): 100 µg/kg

- Chronic Toxicological Effects: Tamoxifen - Investigated as a tumorigen, mutagen, and reproductive effector.

- Carcinogenicity/Other Information:
  - IARC: 1 - Group 1: Carcinogenic to humans (Tamoxifen)
  - California Prop. 65 carcinogen (Tamoxifen)

Carcinogenicity: NTP? No  IARC Monographs? Yes  OSHA Regulated? No

Section 12. Ecological Information

12.1 Toxicity: Avoid release into the environment. Runoff from fire control or dilution water may cause pollution.

Section 13. Disposal Considerations

13.1 Waste Disposal Method: Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):
  - DOT Proper Shipping Name: Not dangerous goods.
  - DOT Hazard Class: UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):
  - ADR/RID Shipping Name: Not dangerous goods.
  - UN Number: Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):
  - ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Hazardous Components (Chemical Name)</th>
<th>S. 302 (EHS)</th>
<th>S. 304 RQ</th>
<th>S. 313 (TRI)</th>
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<tbody>
<tr>
<td>10540-29-1</td>
<td>Tamoxifen</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Hazardous Components (Chemical Name)</th>
<th>Other US EPA or State Lists</th>
</tr>
</thead>
<tbody>
<tr>
<td>10540-29-1</td>
<td>Tamoxifen</td>
<td>CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: Yes</td>
</tr>
</tbody>
</table>
European Community Hazard Symbol codes:

Carcinogenic Hazard: 2; Reproductive Hazard: 2

European Community Risk and Safety Phrases:

R22  Harmful if swallowed.
R45  May cause cancer.
R60  May impair fertility.
R61  May cause harm to the unborn child.
R64  May cause harm to breastfed babies.
S22  Do not breathe dust.
S24/25 Avoid contact with skin and eyes.
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S45  In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible.)
S53  Avoid exposure - obtain special instructions before use.

Regulatory Information
This SDS was prepared in accordance with Regulation (EC) No.1272/2008 and European Directive 67/548/EEC as amended.

Section 16. Other Information

Revision Date: 06/13/2014
Additional Information About This Product: No data available.
Company Policy or Disclaimer:
DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.