1. PRODUCT AND COMPANY IDENTIFICATION

Product name          (Z)-4-Hydroxytamoxifen
Recommended use       For research use only

Supplier Address      Abcam Inc
                      1 Kendall Square, Ste 341
                      Cambridge, MA 02139-1517
                      USA
                      Tel: (617)225-2272 or 888-77-ABCAM (22226) (US toll free)
                      Fax: (866) 739-9884 or (866) 457-9616 (both US toll free)

E-mail address        technical@abcam.com

Emergency telephone   Tel: (617)225-2272 or 888-77-ABCAM (22226) (US toll free) - Monday-Friday 8am-9pm EST.

2. HAZARDS IDENTIFICATION

GHS - Classification

<table>
<thead>
<tr>
<th></th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>4</td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td>4</td>
</tr>
<tr>
<td>Acute inhalation toxicity - dust/mist</td>
<td>4</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>2</td>
</tr>
</tbody>
</table>

GHS Label elements, including precautionary statements

Signal Word
Warning
Hazard statements
H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H322 - Harmful if inhaled
H361 - Suspected of damaging fertility or the unborn child

Precautionary Statements - EU (§28, 1272/2008)
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/ eye protection/ face protection
P270 - Do not eat, drink or smoke when using this product
P264 - Wash face, hands and any exposed skin thoroughly after handling
P304 + P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing
P312 - Call a POISON CENTER or doctor/ physician if you feel unwell
P363 - Wash contaminated clothing before reuse
P405 - Store locked up

Other information
Caution - substance not yet tested completely

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>Classification (Reg. 1272/2008)</th>
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</thead>
<tbody>
<tr>
<td>(Z)-4-Hydroxytamoxifen</td>
<td>68047-06-3</td>
<td>100</td>
<td>Acute Tox. 4 (H302)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 4 (H312)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 4 (H332)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Repr. 2 (H361)</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16

4. FIRST AID MEASURES

General advice
If symptoms persist, call a physician.

Eye contact
Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes.

Skin contact
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If symptoms persist, call a physician.

Inhalation
Move to fresh air. If symptoms persist, call a physician.

Ingestion
Rinse mouth. If symptoms persist, call a physician.

Notes to physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES
Flammable properties: Not flammable.

Flash point: Not determined

Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Explosion Data:
- Sensitivity to Mechanical Impact: None.
- Sensitivity to Static Discharge: None.

Protective equipment and precautions for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear to prevent contact with skin and eyes.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Do not breathe vapors or spray mist.

Environmental precautions: Try to prevent the material from entering drains or water courses.

Methods for containment: Prevent further leakage or spillage if safe to do so.

Methods for cleaning up: Use personal protective equipment. Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Take up mechanically and collect in suitable container for disposal. Avoid dust formation. Clean contaminated surface thoroughly.

Other information: Refer to protective measures listed in sections 7 and 8.

7. HANDLING AND STORAGE

Advice on safe handling: Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Do not breathe vapors or spray mist.

Technical measures/Storage conditions: Keep out of the reach of children. Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines: This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering measures: Showers
Eyewash stations
Ventilation systems

Personal protective equipment:
- Eye/face protection: Tightly fitting safety goggles.
- Skin and body protection: No special protective equipment required.
- Respiratory protection: If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene measures: When using, do not eat, drink or smoke. Remove and wash contaminated clothing before re-use. Provide regular cleaning of equipment, work area and clothing.
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Odor State @20°C</th>
<th>Odor</th>
<th>Physical State @20°C</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>White.</td>
<td>No information available</td>
<td>No information available</td>
<td>No information available</td>
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</table>

<table>
<thead>
<tr>
<th>pH</th>
<th>Flash point</th>
<th>Decomposition temperature</th>
<th>Melting point/Range</th>
<th>No information available</th>
<th>No information available</th>
<th>No information available</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Specific Gravity</th>
<th>No data available</th>
<th>solubility ETHANOL, Dimethylsulfoxide.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporation rate</td>
<td>No information available</td>
<td>Vapor Pressure @20°C (kPa) No information available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>No data available</td>
<td>VOC Content(%) Not applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability
- Stable under recommended storage conditions.

Incompatible products
- None known based on information supplied.

Conditions to avoid
- None known based on information supplied.

Hazardous decomposition products

Hazardous polymerization
- Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product Information
- Harmful by inhalation, in contact with skin and if swallowed Harmful if swallowed Product is harmful by skin contact Harmful by inhalation

Inhalation
- Harmful by inhalation

Skin contact
- Harmful in contact with skin

Ingestion
- Harmful if swallowed

Chronic toxicity

Reproductive toxicity
- Product is or contains a chemical which is a known or suspected reproductive hazard

Developmental Toxicity
- Contains ingredients that have suspected developmental hazards Possible risk of harm to the unborn child May cause birth defects

Target Organ Effects
- None known.
12. ECOLOGICAL INFORMATION

Ecotoxicity
The environmental impact of this product has not been fully investigated.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods
This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated packaging
Do not re-use empty containers.

14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>DOT</th>
<th>IATA</th>
<th>ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not dangerous goods</td>
<td>Not dangerous goods</td>
<td>Not dangerous goods</td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>SARA 311</th>
<th>SARA 312</th>
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</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
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<td></td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Sudden Release of Pressure Hazard</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations
International Regulations

WHMIS Note: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H332 - Harmful if inhaled
H361 - Suspected of damaging fertility or the unborn child

Hazard statements
H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H332 - Harmful if inhaled
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Revision Date 25-Feb-2019
Revision Note No information available.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of MSDS