1 Identification of the substance/mixture and of the company/undertaking

Product identifier
Product name: D-Tyrosine
Stock number: A17709, L06936
CAS Number: 556-02-5
EINECS Number: 209-112-6

Relevant identified uses of the substance or mixture and uses advised against.
Sector of Use: SU24 Scientific research and development

Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency telephone number:
During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

2 Hazards identification

Classification of the substance or mixture

GHS07

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

Xi; Irritant

R36/37/38: Irritating to eyes, respiratory system and skin.

Label elements

Labelling according to EU guidelines:

Code letter and hazard designation of product:
Xi Irritant

Risk phrases:
36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
37 Wear suitable gloves.

Hazard description:
WHMIS classification

Classification system

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Health (acute effects) = 1
Plannability = 1
Reactivity = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

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Material Safety Data Sheet  
According to OSHA and ANSI

Printing date 06/01/2011  
Reviewed on 05/03/2006

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**Product name:** D-Tyrosine

**vPvB:** Not applicable.

---

**3 Composition/information on ingredients**

**Chemical characterization: Substances**

**CAS#: Description:**

D-Tyrosine (CAS# 556-02-5): 100%

**Identification number(s):**

EINECS Number: 209-112-6

---

**4 First aid measures**

**Description of first aid measures**

**After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

**After skin contact**

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

**After eye contact**

Rinse opened eye for several minutes under running water. Then consult a doctor.

**After swallowing**

Seek immediate medical advice.

---

**5 Firefighting measures**

**Extinguishing media**

Suitable extinguishing agents

Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**Special hazards arising from the substance or mixture**

In case of fire, the following can be released:

- Carbon monoxide and carbon dioxide
- Nitrogen oxides (NOx)

**Advice for firefighters**

- Wear self-contained respirator.
- Wear fully protective impervious suit.

---

**6 Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

**Environmental precautions:**

Do not allow material to be released to the environment without proper governmental permits.

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.

---

**7 Handling and storage**

**Handling**

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

**Information about protection against explosions and fires:** Keep ignition sources away.

**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:** Store away from oxidizing agents.

**Further information about storage conditions:**

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.
8 Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters
Components with limit values that require monitoring at the workplace: Not required.
Additional information: No data

Exposure controls
Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
Material of gloves
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Information on basic physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
</tr>
<tr>
<td>Appearance:</td>
</tr>
<tr>
<td>Form: Powder</td>
</tr>
<tr>
<td>Color: White</td>
</tr>
<tr>
<td>Odor: Not determined</td>
</tr>
<tr>
<td>Odour threshold: Not determined.</td>
</tr>
<tr>
<td>pH-value: Not applicable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change in condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point/Melting range: &gt;300°C (&gt;572 °F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range: Not determined</td>
</tr>
<tr>
<td>Sublimation temperature / start: Not determined</td>
</tr>
</tbody>
</table>

| Flammability (solid, gaseous): Not determined.         |
| Ignition temperature: Not determined.                  |
| Decomposition temperature: Not determined.             |
| Auto igniting: Not determined.                         |
| Danger of explosion: Product does not present an explosion hazard. |

<table>
<thead>
<tr>
<th>Explosion limits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower: Not determined</td>
</tr>
<tr>
<td>Upper: Not determined</td>
</tr>
</tbody>
</table>

| Vapor pressure: Not applicable.                       |
| Density: Not determined                               |
| Relative density: Not determined.                     |
| Vapour density: Not applicable.                       |
| Evaporation rate: Not applicable.                     |

<table>
<thead>
<tr>
<th>Segregation coefficient (n-octanol/water): Not determined.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity:</td>
</tr>
<tr>
<td>dynamic: Not applicable.</td>
</tr>
<tr>
<td>kinematic: Not applicable.</td>
</tr>
<tr>
<td>Other information: No further relevant information available.</td>
</tr>
</tbody>
</table>
10 Stability and reactivity

Reactivity
Chemical stability
Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions No dangerous reactions known
Incompatible materials: Oxidizing agents
Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Nitrogen oxides

11 Toxicological information

Information on toxicological effects
Acute toxicity:
Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.
Sensitization: No sensitizing effects known.
Subacute to chronic toxicity:
Other than potential irritation (see above), no information on illness or injury to humans from acute or chronic exposure to this product is available.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

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.
Additional ecological information:
General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.
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 Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

Not a hazardous material for transportation.

DOT regulations:
Hazard class: None
Land transport ADR/RID (cross-border)
ADR/RID class: None
Maritime transport IMDG:
IMDG Class: None
Marine pollutant: No
Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class: None

(Contd. of page 3)
Material Safety Data Sheet
According to OSHA and ANSI

Product name: D-Tyrosine

(Contd. of page 4)

Special precautions for user Not applicable.
Transport/Additional information: Not dangerous according to the above specifications.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

15 Regulatory information
Safety, health and environmental regulations/legislation specific for the substance or mixture
Product related hazard informations:

Hazard symbols:
Xi Irritant

Risk phrases:
36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
37 Wear suitable gloves.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Non-Domestic Substances List (NDSL).

Information about limitation of use: For use only by technically qualified individuals.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information
Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.
Contact:
Zachariah C. Holt
Global EHS Manager

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)