1 Identification of substance:

Product details:
Product name: L-Tyrosine

Stock number:
A11141
L06228

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency information:
During normal hours the Health, Safety and Environmental Department. After normal hours call
Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:
Description: (CAS#)
L-Tyrosine (CAS# 60-18-4); 100%
Identification number(s):
EINECS Number: 200-460-4

3 Hazards identification

Hazard description:

Xi Irritant

Information pertaining to particular dangers for man and environment
R 36/37/38 Irritating to eyes, respiratory system and skin.

Classification system

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

HEALTH 1
   Health (acute effects) = 1
   Flammability = 1
   Reactivity = 1

FIRE 1

REACTIVITY 1

GHS label elements

Warning

3.2/2 - Causes skin irritation.
3.3/2A - Causes serious eye irritation.
3.8/3 - May cause respiratory irritation.

Prevention:
Avoid breathing dust/fume/gas/mist/vapours/spray.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment (see label).
If skin irritation occurs: Get medical advice/attention.
If eye irritation persists: Get medical advice/attention.
Take off contaminated clothing and wash before reuse.

Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Disposal:
Dispose of contents/container in accordance with local/regional/national/international regulations.

4 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 Fire fighting measures

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

Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide
Nitrogen oxides (NOx)

Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation

Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collection:
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

Additional information:
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
Information 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:
No special measures required.

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:
Protect from exposure to light.
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and 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.

Components with limit values that require monitoring at the workplace:
Not required.

Additional information:
No data
9 Physical and chemical properties:

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form:</td>
</tr>
<tr>
<td>Powder</td>
</tr>
<tr>
<td>Color:</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Odor:</td>
</tr>
<tr>
<td>Not determined</td>
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<tr>
<td>Change in condition</td>
</tr>
<tr>
<td>Melting point/Melting range:</td>
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<tr>
<td>Decomposes</td>
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<tr>
<td>Boiling point/Boiling range:</td>
</tr>
<tr>
<td>Not determined</td>
</tr>
<tr>
<td>Sublimation temperature / start:</td>
</tr>
<tr>
<td>Not determined</td>
</tr>
</tbody>
</table>

| Flash point:                  |
| Not applicable               |
| Ignition temperature:        |
| Not determined               |
| Decomposition temperature:   |
| >295°C (>563°F)              |
| Danger of explosion:         |
| Product does not present an explosion hazard. |
| Explosion limits:            |
| Lower:                       |
| Not determined               |
| Upper:                       |
| Not determined               |
| Vapor pressure:              |
| Not determined               |
| Density at 20°C (68°F):      |
| 1.456 g/cm³                  |

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
Materials to be avoided: Oxidizing agents
Dangerous reactions: No dangerous reactions known
Dangerous products of decomposition:
Carbon monoxide and carbon dioxide
Nitrogen oxides

11 Toxicological information

Acute toxicity:
LD/LC50 values that are relevant for classification:
Oral LD50 >5110 mg/kg (rat)
Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.
Sensitization: No sensitizing effects known.
Other information (about experimental toxicology):
Reproductive effects have been observed on tests with laboratory animals.
Subacute to chronic toxicity:
L-Tyrosine is the naturally occurring isomer of the widely distributed non-essential amino acid found in silk waste, casein, and corn. It is used as a growth factor in nutrition, a dietary supplement, and in biochemical research. Acute or chronic toxicity only occurs at high dose levels, causing behavioral and metabolic effects. However, effects on reproductive fertility and fetal development of laboratory animals have been documented.
Additional toxicological information:
Possible risk of impaired fertility.
Possible risk of harm to the unborn child.
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:

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.

13 Disposal considerations

Product:
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

**Air transport ICAO-TI and IATA-DGR:**
**ICAO/IATA Class:** None

**Transport/Additional information:** Not dangerous according to the above specifications.

15 Regulations

**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.

**Information about limitation of use:** For use only by technically qualified individuals.

**Other regulations, limitations and prohibitive regulations**
Although this chemical may sometimes be used as a food or drug or cosmetic, our products are not approved or suitable for such use or for human consumption.

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 Holt
**Product name: L-Tyrosine**

**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)
- **GHS:** Globally Harmonized System of Classification and Labelling of Chemicals
- **EINECS:** European Inventory of Existing Commercial Chemical Substances
- **CAS:** Chemical Abstracts Service (division of the American Chemical Society)
- **HMIS:** Hazardous Materials Identification System (USA)
- **LC50:** Lethal concentration, 50 percent
- **LD50:** Lethal dose, 50 percent