SAFETY DATA SHEET
ThreAMINO® L-Threonine, Feed Grade 98,5%

Material no. Specification Order Number
101690

Version Revision date Print Date Page
2.0 / US 04/22/2015 04/22/2015 1 / 13

1. Identification

1.1. Product identifier
Trade name ThreAMINO®
L-Threonine, Feed Grade 98,5%

CAS-No. 72-19-5

1.2. Recommended use of the chemical and restrictions on use
Relevant applications identified Feed additive

1.3. Details of the supplier of the safety data sheet
Company Evonik Corporation USA
299 Jefferson Road
Parsippany,NJ 07054-0677
USA

Telephone 973-929-8000
Telefax 973-929-8040
Email address Product-Regulatory-Services@Evonik.com

1.4. 24 HOUR EMERGENCY TELEPHONE NUMBERS:
CHEMTREC - US & CANADA: 800-424-9300
CHEMTREC MEXICO: 01-800-681-9531
CHEMTREC INTERNATIONAL: +1 703-527-3887 (collect calls accepted)
Product Regulatory Services : 973-929-8060

2. Hazards identification

2.1. Classification of the substance or mixture
Classification according to Regulation 29CFR 1910.1200
Remarks Not a hazardous substance or mixture.

2.2. Label elements
Statutory basis Classification according to Regulation 29CFR 1910.1200
Remarks Not a hazardous substance or mixture.

Supplemental hazard information / Label elements
Contains Residual , L-Threonine
The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 99.5 %

2.3. Other hazards
May form explosive dust-air mixture.
Inhalation No hazard expected in normal use.
Skin No hazard expected in normal use.
3. Composition/information on ingredients

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<td></td>
</tr>
</tbody>
</table>

**L-Threonine**

- CAS-No.: 72-19-5
- >= 98.5%

**Other information**

This material is classified as not hazardous under OSHA regulations.
This product is intended for FDA regulated uses only.

4. First aid measures

4.1. Description of first aid measures

**Inhalation**
In case product dust is released:
Possible discomfort: cough, sneezing
Move victims into fresh air.

**Skin contact**
No hazards which require special first aid measures.

**Eye contact**
Possible discomfort is due to foreign substance effect.
Rinse thoroughly with plenty of water keeping eyelid open.
In case of persistent discomfort: Consult an ophthalmologist.

**Ingestion**
Have the mouth rinsed with water.
After absorbing large amounts of substance
Consult a physician.

4.2. Most important symptoms and effects, both acute and delayed

4.3. Indication of any immediate medical attention and special treatment needed

After absorbing large amounts of substance:
Acceleration of gastrointestinal passage

5. Fire-fighting measures

5.1. Extinguishing media

- Suitable extinguishing media: Water, mist, Foam
- Unsuitable extinguishing media: quenching powder, Carbon dioxide (CO2)

5.2. Special hazards arising from the substance or mixture

In the case of fire, the following hazardous smoke fumes may be produced: carbon monoxide, carbon dioxide, nitric oxides, hydrocyanic acid.
In the event of fire and/or explosion do not breathe fumes.

5.3. Advice for firefighters

Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities.
Fire residues should be disposed of in accordance with the regulations.
In the event of fire, wear self-contained breathing apparatus.
6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Wear personal protective equipment. Keep unauthorized persons away.

6.2. Environmental precautions
Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.

6.3. Methods and material for containment and cleaning up
Absorb mechanically avoiding production of dust.

7. Handling and storage

7.1. Precautions for safe handling
Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities
Advice on protection against fire and explosion
Take precautionary measures against static charges, keep away from sources of ignition. Avoid dust formation.

Storage
Store in a cool and shaded area. 
Keep containers dry and tightly closed to avoid moisture absorption and contamination.

German storage class
11 - Combustible Solids
Dust explosion class
St1
Method: VDI 3673
Maximum rate of pressure rise: 66 bar/s
Standardized max. rate of pressure increase, KSt: 66bar·m/s

8. Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Exposure limit for dust</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>type of exposure</th>
<th>Time Weighted Average (TWA): (ACGIH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mg/m³</td>
<td>3 mg/m³</td>
<td>Respirable fraction.</td>
<td>NIOSH method 0500</td>
<td>NIOSH method 0600</td>
</tr>
<tr>
<td>10 mg/m³</td>
<td>10 mg/m³</td>
<td>Respirable fraction.</td>
<td>NIOSH method 0500</td>
<td>NIOSH method 0600</td>
</tr>
<tr>
<td>15 mg/m³</td>
<td>15 mg/m³</td>
<td>Inhale particulate.</td>
<td>NIOSH method 0500</td>
<td>NIOSH method 0600</td>
</tr>
<tr>
<td>5 mg/m³</td>
<td>5 mg/m³</td>
<td>Respirable fraction.</td>
<td>NIOSH method 0500</td>
<td>NIOSH method 0600</td>
</tr>
</tbody>
</table>

Time Weighted Average (TWA): (ACGIH)

Time Weighted Average (TWA): Permissible Exposure Limit (PEL): (OSHA Z1)
8.2. Exposure controls

Engineering measures
Use process enclosures, local exhaust ventilation or other engineering controls to control airborne exposure.
Take precautionary measures against static discharges. Earthing of equipment.

Personal protective equipment

Respiratory protection
A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

Hand protection
Glove material: Natural rubber (NR), for example, Cama Clean 708, Kächele-Cama Latex GmbH (KCL), Germany
Material thickness: 0.5 mm
Break through time: 8 h
Method: DIN EN 374
Glove material: Nitrile, for example, Dermatril 740, Kächele-Cama Latex GmbH (KCL), Germany
Material thickness: 0.11 mm
Break through time: 8 h
Method: DIN EN 374
The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

Eye protection
Safety glasses

Skin and body protection
No special protective equipment required.

Hygiene measures
Wash face and/or hands before break and end of work.
Cleanse and apply cream to skin after work.

Protective measures
Handle in accordance with good industrial hygiene and safety practice.
If there is the possibility of skin/eye contact, the indicated hand/eye/body protection should be used.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties
physical state: solid
Colour: white until light grey
**SAFETY DATA SHEET**

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<thead>
<tr>
<th>Form</th>
<th>solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odour</td>
<td>characteristic</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>not determined</td>
</tr>
<tr>
<td>pH</td>
<td>5.0 - 6.5 (25 g/l) (25 °C)</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>253 °C decomposition</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>not applicable solid</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>not highly flammable Method: UN method N.1</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>dust: 60 g/m³ Method: VDI 3673 grain size &lt; 63µm</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>not applicable</td>
</tr>
<tr>
<td>Vapour density</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapour density</td>
<td>no data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>85.7 g/l (20 °C) Method: OECD Test Guideline 105</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: -2.94 Related to substance: pure substance</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>370 °C Method: VDI Guideline 2263 sheet 1 (BAM-furnace) for dust whirl ed up mean grain size 49µm</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>253 °C TG (thermal gravimetric analysis)</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>not applicable solid</td>
</tr>
</tbody>
</table>
9.2. Other information

Explosiveness
The product is susceptible to dust explosion.

Sublimation point
200 °C

Bulk density
585 - 715 kg/m³

glow temperature
> 400 °C
Method: VDI 2263

Minimum ignition energy
> 10 mJ (25 °C)
Classification: Normal combustability
Method: VDI Guideline 2263 sheet 1
mean grain size: 18 µm
sieve fraction with inductance

Maximum absolute explosive pressure
9.6 bar
(with 1000 g/m³)

grain size
< 63 µm

Metal corrosion
no data available

Burning number
BZ 3 - local burning or smouldering with little or no spreading.
Method: Combustibility test in accordance with VDI 2263

10. Stability and reactivity

10.1. Reactivity
No further information available

10.2. Chemical stability
Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions
Possibility of hazardous reactions
Dust can form an explosive mixture in air.

10.4. Conditions to avoid
See chapter
7.2. Conditions for safe storage, including any incompatibilities

10.5. Incompatible materials
Avoid contact with oxidizing substances.

10.6. Hazardous decomposition products
No hazardous decomposition products known.

11. Toxicological information

11.1. Information on toxicological effects
Acute oral toxicity
NOEL Rat: 2000 mg/kg
Method: OECD TG 423
Test substance: comparable product

LD50 Rat: > 5000 mg/kg
Method: OECD TG 423
Test substance: comparable product

Acute inhalation toxicity
NOAEL Rat: 5.15 mg/l / 4 h
Method: OECD Test Guideline 403

Acute dermal toxicity
Assessment: no data available

Skin irritation
Rabbit
No skin irritation
Method: OECD Test Guideline 404

Eye irritation
Rabbit
No eye irritation
Method: OECD Test Guideline 405

Sensitization
Magnusson & Kligman Guinea pig: Does not cause skin sensitisation.
Method: OECD Test Guideline 406

Repeated dose toxicity
Oral Rat (male/female)
Testing period: 28 d
Subsequent observation period: 42 day
NOAEL: > 1000 mg/kg
Target organ/effect: no pathological changes
Method: OECD 407

Assessment of STOT single exposure
Assessment: no data available

Assessment of STOT repeat exposure
Assessment: no data available

Risk of aspiration toxicity
no data available

Gentoxicity in vitro
Chromosome aberration test in vitro Human lymphocytes 625 - 5000 µg/ml negative
Method: OECD TG 473

Ames test Salmonella typhimurium <= 5000 µg/plate negative
Metabolic activation: with or without
Method: OECD TG 471
Test substance: comparable product

Carcinogenicity
no data available

carcinogenicity assessment
Contains no carcinogenic substances as defined by NTP, IARC and/or OSHA.

Toxicity to reproduction
no data available
## Toxicological information on components

### L-Threonine

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute oral toxicity</strong></td>
<td>LD50 Rat: &gt; 5000 mg/kg</td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 401</td>
</tr>
<tr>
<td><strong>Acute inhalation toxicity</strong></td>
<td>LC0 Rat (male/female): &gt; 5.15 mg/l / 4 h</td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 403</td>
</tr>
<tr>
<td>Limit test (maximum concentration attainable in experiments) - No deaths occurred.</td>
<td></td>
</tr>
<tr>
<td><strong>Acute dermal toxicity</strong></td>
<td>Assessment: no data available</td>
</tr>
<tr>
<td><strong>Skin irritation</strong></td>
<td>Rabbit</td>
</tr>
<tr>
<td>No skin irritation</td>
<td>Method: OECD Test Guideline 404</td>
</tr>
<tr>
<td><strong>Eye irritation</strong></td>
<td>Rabbit</td>
</tr>
<tr>
<td>No eye irritation</td>
<td>Method: OECD Test Guideline 405</td>
</tr>
<tr>
<td><strong>Sensitization</strong></td>
<td>Magnusson &amp; Kligman Guinea pig: Does not cause skin sensitisation.</td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 406</td>
</tr>
<tr>
<td><strong>Repeated dose toxicity</strong></td>
<td>Oral Rat (male/female)</td>
</tr>
<tr>
<td>Testing period</td>
<td>28 d</td>
</tr>
<tr>
<td>Subsequent observation period</td>
<td>42 day</td>
</tr>
<tr>
<td>NOAEL</td>
<td>&gt; 1000 mg/kg</td>
</tr>
<tr>
<td>Target organ/effect</td>
<td>no pathological changes</td>
</tr>
<tr>
<td>Method</td>
<td>OECD 407</td>
</tr>
<tr>
<td><strong>Genotoxicity in vitro</strong></td>
<td>Chromosome aberration test in vitro Human lymphocytes 625 - 5000 µg/ml negative</td>
</tr>
<tr>
<td>Metabolic activation</td>
<td>with or without</td>
</tr>
<tr>
<td>Method</td>
<td>OECD TG 473</td>
</tr>
<tr>
<td>Ames test Salmonella typhimurium &lt;= 5000 µg/plate negative</td>
<td></td>
</tr>
<tr>
<td>Metabolic activation</td>
<td>with or without</td>
</tr>
<tr>
<td>Method</td>
<td>OECD TG 471</td>
</tr>
<tr>
<td>Test substance</td>
<td>comparable product</td>
</tr>
</tbody>
</table>

### 12. Ecological information

#### 12.1. Toxicity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity in aquatic invertebrates</td>
<td>NOEC Daphnia magna: &gt; 1000 mg/l / 48 h</td>
</tr>
<tr>
<td>Method</td>
<td>OECD TG 202</td>
</tr>
<tr>
<td>Toxicity to algae</td>
<td>EC50 static test Desmodesmus subspicatus (green algae): &gt; 1000 mg/l / 72 h</td>
</tr>
</tbody>
</table>
Toxicity to bacteria
EC 80 nitrobacteria: 119 mg/l / 69 h
Method: literature

Toxicity in terrestrial plants
EC 40 Hordeum spec.: ca. 119 mg/l / 144 h
Method: literature

12.2. Persistence and degradability
Biodegradability
Result: rapidly biodegradable
Method: QSAR-Method

12.3. Bioaccumulative potential
Bioaccumulation
No data available

12.4. Mobility in soil
Mobility
No data available

12.5. Other adverse effects
Further Information
No further information available

13. Disposal considerations
13.1. Waste treatment methods
Product
Waste must be disposed of in accordance with federal, provincial and local regulations.

Uncleaned packaging
Packaging material should be recycled or disposed of in accordance with federal, state and local regulations.

14. Transport information

Not dangerous according to transport regulations.

14.1. UN number:
14.2. UN proper shipping name:
14.3. Transport hazard class(es):
14.4. Packing group:
14.5. Environmental hazards (Marine pollutant):
14.6. Special precautions for user: Yes

Not dangerous according to transport regulations.

15. Regulatory information
US Federal Regulations

OSHA
If listed below, chemical specific standards apply to the product or components:

- None listed

Clean Air Act Section (112)
If listed below, components present at or above the de minimus level are hazardous air pollutants:

- None listed

CERCLA Reportable Quantities
If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

- None listed

SARA Title III Section 311/312 Hazard Categories
The product meets the criteria only for the listed hazard classes:

- No SARA Hazards

SARA Title III Section 313 Reportable Substances
If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- None listed

Toxic Substances Control Act (TSCA)
If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

- None listed

State Regulations

California Proposition 65
A warning under the California Drinking Water Act is required only if listed below:

- None listed

International Chemical Inventory Status
Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact the Product Regulatory Services Department.

- Europe (EINECS/ELINCS) listed/registered
- USA (TSCA) listed/registered
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Canada (DSL) listed/registered
Australia (AICS) listed/registered
Japan (MITI) listed/registered
Korea (TCCL) listed/registered
Philippines (PICCS) listed/registered
China listed/registered
Switzerland listed/registered

An employer using HMIS/NFPA labeling must through training ensure that its employees are fully aware of the hazards of the chemicals used.

HMIS Ratings

Health : 0
Flammability : 1
Physical Hazard : 0

16. Other information

Further information

Revision date 04/22/2015

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

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Legend

ACC American Chemistry Council
ACGIH American Conference of Governmental Industrial Hygienists
ACS Advisory Committee on Sustainability
ADI Acceptable Daily Intake
ASTM American Society for Testing and Materials
ATP Adaptation to Technical Progress
BCF Bioconcentration factor
BOD Biochemical oxygen demand
c.c. closed cup
CAO Cargo Aircraft Only
Carc Carcinogen
CAS Chemical Abstract Services
CDN Canada
CEPA Canadian Environmental Protection Act
CERCLA Comprehensive Environmental Response – Compensation and Liability Act
CFR Code of Federal Regulations
CMR carcinogenic-mutagenic-toxic for reproduction
COD Chemical oxygen demand
DIN German Institute for Standardization
DMEL Derived minimum effect level
DNEL Derived no effect level
DOT Department of Transportation
EC50 half maximal effective concentration
EPA Environmental Protection Agency
ErC50 Reduction of Growth Rate
ERG Emergency Response Guide Book
FDA Food and Drug Administration
GHS Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
GLP Good Laboratory Practice
GMO Genetic Modified Organism
HCS Hazard Communication Standard
HMIS Hazardous Materials Identification System
IARC International Agency for Research on Cancer
IATA International Air Transport Association
IBC Intermediate Bulk Container
ICAO International Civil Aviation Organization- Technical Instructions
ICCA International Council of Chemical Association
ID Identification number
IMDG International Maritime Dangerous Goods
IUPAC International Union of Pure and Applied Chemistry
ISO International Organization For Standardization
LC50 50 % Lethal Concentration
LD50 50 % Lethal Dose
L(E)C50 LC50 or EC50
LOAEL Lowest observed adverse effect level
LOEL Lowest observed effect level
MARPOL International Convention for the Prevention of Pollution from Ships
NFPA National Fire Protection Association
NOAEL No observed adverse effect level
NOEC no observed effect concentration
NOEL no observed effect level
o. c. open cup
OECD Organisation for Economic Cooperation and Development
OEL Occupational Exposure Limit
OSHA Occupational Safety and Health Administration
PBT Persistent, bioaccumulative, toxic
PEC Predicted effect concentration
PNEC Predicted no effect concentration
RQ Reportable Quantity
SDS Safety Data Sheet
STOT Specific Target Organ Toxicity
UN United Nations
vPvB very persistent, very bioaccumulative
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</tr>
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</table>

**voc**
volatile organic compounds

**WHMIS**
Workplace Hazardous Materials Information System

**WHO**
World Health Organization