

SAFETY DATA SHEET**L-Threonine**

Material no.	99079561	Version	1.0 / US
Specification	192928	Revision date	05/31/2017
Order Number	05693449	Print Date	06/03/2017
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1. Identification**1.1. Product identifier**

Trade name L-Threonine

CAS-No. 72-19-5

1.2. Recommended use of the chemical and restrictions on useRelevant applications identified For industrial use
Pharmaceutical intermediate
Chemical intermediate**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

E-mail 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.

2.3. Other hazards

None known

3. Composition/information on ingredients

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3.1. Substances

• L-Threonine	100%
CAS-No.	72-19-5
Remarks	Not a hazardous substance or mixture.

3.2. Mixtures**not applicable**

No hazardous ingredients

4. First aid measures**4.1. Description of first aid measures****General advice**

Pay attention to self-protection.

Remove victims from hazardous area. Immediately remove soiled or soaked clothing and remove it to a safe distance. Keep victim warm, in a stabilized position and covered.

Do not leave victims unattended.

If the casualty is unconscious: Place the victim in the recovery position.

Inhalation

Inhalation is possible if aerosols, mists, dusts, or smoke form.

Move victims into fresh air.

With labored breathing: Provide with oxygen. Consult a doctor.

If the casualty is not breathing: Perform mouth-to-mouth resuscitation, notify emergency physician immediately.

Skin contact

Wash off affected area immediately with plenty of water for at least 15 minutes.

If symptoms persist, consult a physician for treatment.

Eye contact

With eye held open, thoroughly rinse immediately with plenty of water for at least 10 minutes.

In case of persistent discomfort: Consult an ophthalmologist.

Ingestion

Rinse mouth.

Immediately give large quantities of water to drink.

Obtain medical attention.

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

None known

Hazards

Other dangerous properties can not be excluded.

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

This substance does not have any noteworthy noxious potential. Damage to health is thus not expected.

5. Fire-fighting measures**5.1. Extinguishing media**

Suitable extinguishing media: All extinguishing substances suitable.

Unsuitable extinguishing media: Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Danger of decomposition under influence of heat.

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Hazard-determining flue gases might develop in case of fire:

Carbon monoxide
Carbon dioxide (CO₂)
Nitrogen oxides (NO_x)

5.3. Advice for firefighters

Contaminated extinguishing water must be treated at a suitable disposal plant in accordance with waste management laws.

Water used to extinguish fire should not enter drainage systems, soil or stretches of water.

Use water spray to cool unopened containers.

In case of fire, remove the endangered containers and bring to a safe place, if this can be done safely.

Fire residues should be disposed of in accordance with the regulations.

Keep out unprotected persons.

In the event of fire, wear self-contained breathing apparatus.

Wear personal protective equipment.

As in any fire, wear self-contained positive-pressure breathing apparatus and full protective gear.

6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Keep unauthorized persons away.

6.2. Environmental precautions

Observe regulations on prevention of water pollution (check, dam up, cover up). Do not allow entrance in sewage water, soil, stretches of water, drainage systems, surface water. If the product contaminates rivers and lakes or drains inform respective authorities. 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

Pick up mechanically. Collect in suitable containers. To absorb spilled substance an approved industrial vacuum cleaner is recommended. If necessary, the spilled substance should be moistened. Clean contaminated surface thoroughly. Pack and label wastes like the pure substance. Do not detach label from the delivery containers prior to disposal. Disposal according to local authority regulations.

7. Handling and storage**7.1. Precautions for safe handling**

Avoid dust formation. Take precautionary measures against static discharges. Avoid residues of the product on the containers.

7.2. Conditions for safe storage, including any incompatibilities**Advice on protection against fire and explosion**

Normal measures for preventive fire protection.

Keep away from flames / sparks, no smoking.

Ensure there are sufficient retaining facilities for water used to extinguish fire.

Storage

Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.

Further information

Protect from sunlight, warmth and heat.

In order to ensure due transportation, make certain that stacks are of the correct height, containers are securely fastened so as not to fall off, and labelled according to the regulations.

In the event of internal transportation, already-opened containers are to be kept closed in order to avoid spillage.

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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****Other information**

Contains no substances with occupational exposure limit values.

DNEL/DMEL values

Remarks	No substance-related safety assessment is necessary / has been conducted for this product.
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PNEC values

Remarks	No substance-related safety assessment is necessary / has been conducted for this product.
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8.2. Exposure controls**Engineering measures**

Ensure suitable suction/aeration at the work place and with operational machinery.

Provide for installation of emergency shower and eye bath.

Personal protective equipment**Respiratory protection**

When handling for a short time:

If dust occurs: dust mask with P1 particle filter

in the event of prolonged exposure during handling:

In the case of respirable dust, use self-contained breathing apparatus.

Note time limit for wearing respiratory protective equipment.

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

Applies to handling for brief periods or of small amounts

Glove material Nitrile, for example, Dermatril 740, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness 0.11 mm

Method DIN EN 374

Applies to handling for longer periods or of large amounts

Glove material Nitrile/Chloroprene, for example, Nitopren 717, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness 0.65 mm

Method DIN EN 374

Use impermeable gloves.

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Selection of protective gloves to meet the requirements of specific workplaces.

Suitability for specific workplaces should be clarified with protective glove manufacturers.

The information is based on our own tests, references from the literature and information from glove manufacturers, or derived by analogy with similar materials.

Remember that the useful time per day of a chemical protection glove may be much shorter than the permeation time determined according to EN 374 due to the many different influential factors involved (e.g. temperature).

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 with side-shields conforming to EN166

or

If dust occurs: basket-shaped glasses

Skin and body protection

Select materials and equipment for physical protection depending on the concentration and volume of hazardous substances and the workplace involved.

A safety shower and eye wash fountain should be readily available.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

Hygiene measures

Remove and wash contaminated clothing before re-use.

Do not eat, drink, smoke, or sniff while at work. Wash your hands and/or face before breaks and before termination of work.

Cleanse and apply cream to skin after work.

Preventive skin protection is recommended.

Use barrier cream regularly.

Protective measures

Handle in accordance with good industrial hygiene and safety practice.

Avoid contact with skin, eyes and clothing.

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	from white to cream colour		
Form	solid		
Odour	practically odourless		
Odour Threshold	No data available		
pH	5 - 6	(50 g/l)	(20 °C)
	Water		
Melting point/range	253 - 257 °C decomposition		
Boiling point/range	No data available		
Flash point	not applicable (solid)		

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Evaporation rate	No data available
Flammability (solid, gas)	not highly flammable Method: UN method N.1
Lower explosion limit	dust: 60 g/m ³ Method: VDI 3673 grain size < 63µm
Upper explosion limit	No data available
Vapour pressure	No data available
Relative vapour density	no data available
Relative density	No data available
Water solubility	90.3 g/l (20 °C)
Partition coefficient: n-octanol/water	log Pow: -2.94 Method: (measured)
Autoignition temperature	370 °C Method: VDI Guideline 2263 sheet 1 (BAM-furnace) for dust whirled up mean grain size 49µm
Thermal decomposition	253 °C TG (thermal gravimetric analysis)
Viscosity, dynamic	No data available

9.2. Other information

Explosiveness	The product is susceptible to dust explosion.
Sublimation point	200 °C
Bulk density	ca. 580 kg/m ³
glow temperature	> 400 °C Method: VDI 2263
Minimum ignition energy	> 30 mJ (50 °C) Classification: Normal combustability Method: VDI Guideline 2263 sheet 1 mean grain size: 50 µm sieve fraction with inductance
maximum absolute	9.6 bar

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explosive pressure (with 1000 g/m³)
grain size
< 63µm

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 dangerous reaction known under conditions of normal use.

10.2. Chemical stability

Stable under recommended storage conditions., Decomposes before melting.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions No hazardous reactions are known if properly handled and stored.

10.4. Conditions to avoid

humidity
sun rays, heat, heat effect
On grinding, inertisation

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

Decomposition products in combustion and thermal decomposition
Carbon monoxide, Carbon dioxide (CO₂), Nitrogen oxides (NO_x)

11. Toxicological information**11.1. Information on toxicological effects**

Acute oral toxicity	LD50 Rat: > 5000 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity	LC0 Rat(male/female): > 5.15 mg/l / 4 h Method: OECD Test Guideline 403 limit test (maximum concentration attainable in experiments) - No deaths occurred.
Acute dermal toxicity	No data available
Acute toxicity (other routes of administration)	Rat: 3098 mg/kg / intraperitoneal (i.p.) literature
Skin irritation	Rabbit No skin irritation Method: OECD Test Guideline 404
Eye irritation	Rabbit No eye irritation

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	Method:	OECD Test Guideline 405
Sensitization	Maximisation Test 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	No data available	
Assessment of STOT repeat exposure	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	
	Metabolic activation:	with or without
	Method:	OECD Test Guideline 473
	Ames test Salmonella typhimurium <= 5000 µg/plate negative	
	Metabolic activation:	with or without
	Method:	OECD Test Guideline 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	

12. Ecological information**12.1. Toxicity**

no data available

Toxicity in aquatic invertebrates

EC50 Daphnia magna (Water flea): > 1000 mg/l / 48 h
Method: OECD Test Guideline 202

Toxicity to algae

ErC50 Desmodesmus subspicatus (Scenedesmus subspicatus): > 1000 mg/l / 72 h

End point: growth rate
Method: OECD Test Guideline 201

EbC50 Desmodesmus subspicatus (Scenedesmus subspicatus): > 1000 mg/l / 72 h

End point: Biomass

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Method: OECD Test Guideline 201

12.2. Persistence and degradability

Biodegradability Result: Readily 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
no data available

13. Disposal considerations**13.1. Waste treatment methods****Product**

Waste must be disposed of in accordance with federal, state, provincial and local regulations.

Uncleaned packaging

Do not reuse empty containers and dispose of in accordance with the regulations issued by the appropriate local authorities.

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: --

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- 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

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

Remarks This material does not contain any components with a SARA 302 RQ.

SARA 304 - Emergency Release Notification

Remarks This material does not contain any components with a section 304 EHS RQ.

US. EPA CERCLA Hazardous Substances (40 CFR 302)

Remarks This material does not contain any components with a CERCLA RQ.

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

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State Regulations**California Proposition 65**

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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

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 :	0
Physical Hazard :	0

16. Other information**Further information**

Revision date 05/31/2017

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

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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-TI	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
voc	volatile organic compounds
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization