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.

Eyes	No hazard expected in normal use.
Ingestion	No hazard expected in normal use.

3. Composition/information on ingredients

• L-Threonine	>= 98.5%
CAS-No. 72-19-5	

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

• **exposure limit for dust**		
CAS-No.		
Control parameters	3 mg/m3	Time Weighted Average (TWA):(ACGIH)
type of exposure	Respirable fraction. Suitable measuring processes are: NIOSH method 0500 NIOSH method 0600	
Control parameters	10 mg/m3	Time Weighted Average (TWA):(ACGIH)
type of exposure	Inhalable particulate.	
Control parameters	15 mg/m3	Time Weighted Average (TWA) Permissible Exposure Limit (PEL):(OSHA Z1)
type of exposure	Total dust.	
Control parameters	5 mg/m3	Time Weighted Average (TWA) Permissible Exposure Limit (PEL):(OSHA Z1)
type of exposure	Respirable fraction.	

Suitable measuring processes are:
NIOSH method 0500
NIOSH method 0600

DNEL/DMEL values

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

PNEC values

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

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

Form	solid
Odour	characteristic
Odour Threshold	not determined
pH	5.0 - 6.5 (25 g/l) (25 °C)
Melting point/range	253 °C decomposition
Boiling point/range	not applicable
Flash point	not applicable solid
Evaporation rate	No data available
Flammability (solid, gas)	not highly flammable Method: UN method N.1
Lower explosion limit	dust: 60 g/m³ Method: VDI 3673 grain size < 63µm
Upper explosion limit	No data available
Vapour pressure	not applicable
Vapour density	No data available
Relative vapour density	no data available
Relative density	No data available
Water solubility	85.7 g/l (20 °C) Method: OECD Test Guideline 105
Partition coefficient: n-octanol/water	log Pow: -2.94 Related to substance: pure substance
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	not applicable solid

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 < 63µm
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	
	Metabolic activation:	with or without
	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

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	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
Gentoxicity in vitro	Chromosome aberration test in vitro Human lymphocytes 625 - 5000 µg/ml negative Metabolic activation: with or without 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

12. Ecological information

12.1. Toxicity

Toxicity in aquatic invertebrates	NOEC Daphnia magna: > 1000 mg/l / 48 h Method: OECD TG 202
Toxicity to algae	EC50 static test Desmodesmus subspicatus (green algae): > 1000 mg/l / 72 h

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

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 Hygenists
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-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