Printing date 07/30/2016

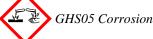
Reviewed on 07/30/2016

1 Identification

- · Product name
- Trade name: 1,4,7-Triazacyclononane, 97%
- · Item number: 07-2500
- · CAS Number: 4730-54-5
- Details of the supplier of the safety data sheet
- · Manufacturer/Supplier: Strem Chemicals, Inc. 7 Mulliken Way NEWBURYPORT, MA 01950 USA info@strem.com
- · Information department: Technical Department · Emergency telephone number: EMERGENCY: CHEMTREC: +1 (800) 424-9300 During normal opening times: +1 (978) 499-1600

2 Hazard(s) identification

· Classification of the substance or mixture



Skin Corr. 1C H314 Causes severe skin burns and eye damage. Eye Dam. 1 H318 Causes serious eye damage.

- · Label elements
- · GHS label elements
- The substance is classified and labeled according to the Globally Harmonized System (GHS). · Hazard pictograms



- · Signal word Danger
- · Hazard-determining components of labeling:
- 1,4,7-Triazacyclononane, 97%
- · Hazard statements
- H314 Causes severe skin burns and eye damage.
- · Precautionary statements
- P231 Handle under inert gas.
- P260 Do not breathe dust/fume/gas/mist/vapors/spray.
- P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

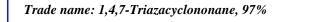
- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

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(Contd. of page 1)

• Classification system: • NFPA ratings (scale 0 - 4)



· HMIS-ratings (scale 0 - 4)

HEALTH4Health = 4FIRE0Fire = 0REACTIVITY0Reactivity = 0

- · Other hazards
- · Results of PBT and vPvB assessment
- **PBT:** Not applicable.
- · vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
- 4730-54-5 1,4,7-Triazacyclononane, 97%

4 First-aid measures

- · Description of first aid measures
- · General information: Immediately remove any clothing soiled by the product.
- · After inhalation: Supply fresh air; consult doctor in case of complaints.
- · After skin contact: Immediately rinse with water.
- After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
- After swallowing: If symptoms persist consult doctor.
- Information for doctor:
- Most important symptoms and effects, both acute and delayed No further relevant information available.
- · Indication of any immediate medical attention and special treatment needed

No further relevant information available.

5 Fire-fighting measures

- · Extinguishing media
- Suitable extinguishing agents:
- CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- \cdot Special hazards arising from the substance or mixture
- During heating or in case of fire poisonous gases are produced.
- Advice for firefighters
- · Protective equipment: Mouth respiratory protective device.

6 Accidental release measures

• *Personal precautions, protective equipment and emergency procedures Mount respiratory protective device.*

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Trade name: 1,4,7-Triazacyclononane, 97%

(Contd. of page 2)

Wear protective equipment. Keep unprotected persons away.

- Environmental precautions: No special measures required.
- *Methods and material for containment and cleaning up:* Use neutralizing agent. Dispose contaminated material as waste according to item 13.
- 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
- Thorough dedusting.
- Ensure good ventilation/exhaustion at the workplace.
- · Information about protection against explosions and fires: Keep respiratory protective device available.
- · 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: Not required.
- Further information about storage conditions: Keep receptacle tightly sealed.
- · Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- · Additional information about design of technical systems: No further data; see item 7.
- · Control parameters
- · Components with limit values that require monitoring at the workplace: Not required.
- · Additional information: The lists that were valid during the creation were used as basis.
- · Exposure controls
- · Personal protective equipment:
- · General protective and hygienic measures:
- Keep away from foodstuffs, beverages and feed.
- Immediately remove all soiled and contaminated clothing.
- Wash hands before breaks and at the end of work.
- Avoid contact with the eyes.
- Avoid contact with the eyes and skin.
- · Breathing equipment:

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

· Protection of hands:



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

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Trade name: 1,4,7-Triazacyclononane, 97%

(Contd. of page 3)

- Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation Material of gloves
- The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
- *Penetration time of glove material The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.*
- · Eye protection:



Tightly sealed goggles

9 Physical and chemical properties

 Information on basic physical and c General Information 	nemicai properties	
· Appearance:		
Form:	Crystalline	
Color:	White	
· Odor:	Odorless	
• Odor threshold:	Not determined.	
· pH-value:	Not applicable.	
· Change in condition		
Melting point/Melting range:	no data °C	
Boiling point/Boiling range:	no data °C	
· Flash point:	Not applicable.	
· Flammability (solid, gaseous):	Not determined.	
· Ignition temperature:		
Decomposition temperature:	Not determined.	
· Auto igniting:	Not determined.	
· Danger of explosion:	Product does not present an explosion hazard.	
· Explosion limits:		
Lower:	Not determined.	
Upper:	Not determined.	
· Vapor pressure:	no data hPa	
· Density:	Not determined.	
· Relative density	Not determined.	
· Vapor density	Not applicable.	
· Evaporation rate	Not applicable.	
· Solubility in / Miscibility with		
Water:	Insoluble.	
· Partition coefficient (n-octanol/wate	r): Not determined.	
· Viscosity:		
Dynamic:	Not applicable.	
		(Contd. on page

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Trade name: 1,4,7-Triazacyclononane, 97%

		(Contd. of page 4)
Kinematic:	Not applicable.	
· Solvent content:		
Organic solvents:	0.0~%	
VOC content:	0.0 g/l / 0.00 lb/gl	
Solids content:	100.0 %	
• Other information	No further relevant information available.	

10 Stability and reactivity

- · *Reactivity* No further relevant information available.
- · Chemical stability
- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
- · Possibility of hazardous reactions No dangerous reactions known.
- · Conditions to avoid No further relevant information available.
- *Incompatible materials:* No further relevant information available.
- · Hazardous decomposition products: No dangerous decomposition products known.

11 Toxicological information

- · Information on toxicological effects
- · Acute toxicity:
- · Primary irritant effect:
- on the skin: No irritant effect.
- on the eye: Strong irritant with the danger of severe eye injury.
- · Sensitization: No sensitizing effects known.
- · Additional toxicological information:

· Carcinogenic categories

· IARC (International Agency for Research on Cancer)

Substance is not listed.

· NTP (National Toxicology Program)

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

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: Must not reach bodies of water or drainage ditch undiluted or unneutralized.
- · Results of PBT and vPvB assessment
- · **PBT:** Not applicable.
- **vPvB:** Not applicable.

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Trade name: 1,4,7-Triazacyclononane, 97%

• Other adverse effects No further relevant information available.

13 Disposal considerations

· Waste treatment methods

· Recommendation:

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- · Uncleaned packagings:
- Recommendation: Disposal must be made according to official regulations.

UN-Number DOT, IMDG, IATA	UN1759
UN proper shipping name DOT, IATA IMDG	Corrosive solids, n.o.s. CORROSIVE SOLID, N.O.S.
Transport hazard class(es)	
DOT	
CORROSIVE 8	
Class	8 Corrosive substances
Label	8
Class	8 Corrosive substances
Label	8
Packing group DOT, IMDG, IATA	III
Environmental hazards: Marine pollutant:	No
Special precautions for user	Warning: Corrosive substances
EMS Number:	F-A,S-B
Stowage Category	Α
Transport in bulk according to Annex	II of



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Trade name: 1,4,7-Triazacyclononane, 97%

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• Transport/Additional	information:
------------------------	--------------

 $\cdot DOT$

CHEMICALS.

• Quantity limitations

On passenger aircraft/rail: 25 kg On cargo aircraft only: 100 kg

· UN ''Model Regulation'':

UN 1759 CORROSIVE SOLIDS, N.O.S., 8, III

15 Regulatory information

- \cdot Safety, health and environmental regulations/legislation specific for the substance or mixture \cdot Sara
- · Section 355 (extremely hazardous substances):
- Substance is not listed.
- · Section 313 (Specific toxic chemical listings):
- Substance is not listed.
- · TSCA (Toxic Substances Control Act):
- Substance is not listed.
- · Proposition 65
- · Chemicals known to cause cancer:
- Substance is not listed.
- · Chemicals known to cause reproductive toxicity for females:
- Substance is not listed.
- · Chemicals known to cause reproductive toxicity for males:
- Substance is not listed.
- · Chemicals known to cause developmental toxicity:
- Substance is not listed.
- · Carcinogenic categories
- · EPA (Environmental Protection Agency)
- Substance is not listed.
- · TLV (Threshold Limit Value established by ACGIH)
- Substance is not listed.
- · NIOSH-Ca (National Institute for Occupational Safety and Health)
- Substance is not listed.
- · GHS label elements
- The substance is classified and labeled according to the Globally Harmonized System (GHS).
- · Hazard pictograms



· Signal word Danger

• *Hazard-determining components of labeling:* 1,4,7-*Triazacyclononane*, 97%

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Trade name:	1,4,7-Triazacyclononane	. 97%
Traue nume.	1, 1 ,7-11 mLacyciononane	, , , , 0

	(Contd. of page 7)
· Hazard statement	nts
H314 Causes se	vere skin burns and eye damage.
· Precautionary s	tatements
P231	Handle under inert gas.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P303+P361+P3	<i>353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.</i>
P305+P351+P3	338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.
· Chemical safety	assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- · Department issuing SDS: Technical Department.
- · Contact: Technical Director
- · Date of preparation / last revision 07/30/2016 / -
- · 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) IMDG: International Maritime Code for Dangerous Goods DOT: US Department of Transportation IATA: International Air Transport Association ACGIH: American Conference of Governmental Industrial Hygienists CAS: Chemical Abstracts Service (division of the American Chemical Society) NFPA: National Fire Protection Association (USA) HMIS: Hazardous Materials Identification System (USA) VOC: Volatile Organic Compounds (USA, EU) PBT: Persistent, Bioaccumulative and Toxic vPvB: very Persistent and very Bioaccumulative NIOSH: National Institute for Occupational Safety OSHA: Occupational Safety & Health TLV: Threshold Limit Value PEL: Permissible Exposure Limit REL: Recommended Exposure Limit Skin Corr. 1C: Skin corrosion/irritation, Hazard Category 1C Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1