

Safety Data Sheet acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

1 Identification

- **Product identifier**
- **Trade name: 4-hydroxy Nonenal Mercapturic Acid**
- **Synonym** N-acetyl-S-(tetrahydro-5-hydroxy-2-pentyl-3-furanyl)-L-cysteine
- **Other means of identification**
- **Article number:** 32110
- **Application of the substance / the mixture**
This product is for research use - Not for human or veterinary diagnostic or therapeutic use.
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Cayman Chemical Co.
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108
USA
- **Information department:** Product safety department
- **Emergency telephone number:**
During normal opening times: +1 (734) 971-3335
US/CANADA: 800-424-9300
Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flammable liquids 2 H225 Highly flammable liquid and vapor.



GHS07

Eye irritation 2A H319 Causes serious eye irritation.

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



GHS02



GHS07

(Contd. on page 2)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 1)

- **Signal word** Danger

- **Hazard statements**

H225 Highly flammable liquid and vapor.

H319 Causes serious eye irritation.

- **Precautionary statements**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233 Keep container tightly closed.

P240 Ground / bond container and receiving equipment.

P241 Use explosion-proof [electrical/ventilating/lighting] equipment.

P242 Use non-sparking tools.

P243 Take action to prevent static discharge.

P264 Wash thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or 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.

P337+P313 If eye irritation persists: Get medical advice/attention.

P370+P378 In case of fire: Use CO₂, powder or water spray to extinguish.

P403+P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Information pertaining to particular dangers for man and environment:**

- **Classification system:**

- **NFPA ratings (scale 0 - 4)**



Health = 2

Fire = 3

Reactivity = 0

- **HMIS-ratings (scale 0 - 4)**



Health = 2

Fire = 3

Reactivity = 0

- **Other hazards**

- **Results of PBT and vPvB assessment**

- **PBT:** Not applicable.

- **vPvB:** Not applicable.

- **Classification according to (d)(1)(ii) of § 1910.1200**

The SDS issuer does not object to the classifications provided by importers or manufacturers of precursor products.

- **Hazards not otherwise classified**

There are no adverse physical or health effects known that are not covered by the hazard classes of the Hazard Communications Standard.

3 Composition/information on ingredients

- **Chemical characterization: Mixtures**

- **Description:** Mixture of the substances listed below with nonhazardous additions.

(Contd. on page 3)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 2)

Dangerous components:

CAS: 64-17-5	ethanol	99.0%
RTECS: KQ6300000		

Other ingredients

146764-24-1	4-hydroxy Nonenal Mercapturic Acid	1.0%
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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. If symptoms persist, consult a doctor.

After swallowing: If symptoms persist consult 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.

Special hazards arising from the substance or mixture No further relevant information available.

Advice for firefighters

Protective equipment: No special measures required.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Environmental precautions:

Dilute with plenty of water.

Do not allow to enter sewers/ surface or ground water.

Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to section 13.

Ensure adequate ventilation.

Protective Action Criteria for Chemicals
PAC-1:

64-17-5	ethanol	1,800 ppm
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PAC-2:

64-17-5	ethanol	3300* ppm
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PAC-3:

64-17-5	ethanol	15000* ppm
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(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 3)

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

Precautions for safe handling

- No special precautions are necessary if used correctly.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Avoid prolonged or repeated exposure.
- Keep away from sources of ignition.
- Take precautionary measures against static discharge.

Information about protection against explosions and fires:

- Keep ignition sources away - Do not smoke.
- Protect against electrostatic charges.

Conditions for safe storage, including any incompatibilities

- Storage:** Store in accordance with information listed on the product insert.
- Requirements to be met by storerooms and receptacles:** Store in a cool location.
- Information about storage in one common storage facility:** Not required.
- Further information about storage conditions:**
 - Keep receptacle tightly sealed.
 - Store in cool, dry conditions in well sealed receptacles.
- Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

Control parameters
Components with limit values that require monitoring at the workplace:
64-17-5 ethanol

PEL	Long-term value: 1900 mg/m ³ , 1000 ppm
REL	Long-term value: 1900 mg/m ³ , 1000 ppm
TLV	Short-term value: 1880 mg/m ³ , 1000 ppm
A3	

- Additional information:** The lists that were valid during the creation were used as basis.

Exposure controls

- Appropriate engineering controls** No further data; see section 7.

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:** Not required.

(Contd. on page 5)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 4)

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.

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. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

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 chemical properties

General Information

Physical state

Liquid

Color:

Colorless

Odor:

Alcohol-like

Structural Formula

C₁₄H₂₅NO₅S

Molecular Weight

319.4 g/mol

Storage Buffer

Odor threshold:

Not determined.

Formulation

A solution in ethanol

Melting point/Melting range:

-114 °C (-173.2 °F)

Boiling point/Boiling range:

78 °C (172.4 °F)

Flammability:

Highly flammable.

Explosion limits:

Lower:

3.3 Vol %

Upper:

19 Vol %

Flash point:

13 °C (55.4 °F)

Auto igniting:

425 °C (797 °F)

Decomposition temperature:

Not determined.

pH-value:

Not determined.

Viscosity:

Kinematic:

Not determined.

SOLUBILITY

DMF: 50 mg/ml; DMSO: 50 mg/ml; Ethanol: 50 mg/ml; PBS pH 7.2: 0.1 mg/ml

Dynamic at 20 °C (68 °F):

1.2 mPas

(Contd. on page 6)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 5)

· Solubility in / Miscibility with	
· Water at 20 °C (68 °F):	1,000 g/l
· Partition coefficient (n-octanol/water):	Not determined.
· Vapor pressure at 20 °C (68 °F):	59 hPa (44.3 mm Hg)
· Vapor pressure at 50 °C (122 °F):	280 hPa (210 mm Hg)
· Density at 20 °C (68 °F):	0.79 g/cm ³ (6.59255 lbs/gal)
· Relative density	Not determined.
· Vapor density	Not determined.
· Particle characteristics	Not applicable.
· Other information	
· Appearance:	
· Form:	Liquid
· Important information on protection of health and environment, and on safety.	
· Ignition temperature:	Product is not selfigniting.
· Danger of explosion:	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· Solvent content:	
· Organic solvents:	99.0 %
· VOC content:	99.00 %
	990.0 g/l / 8.26 lb/gal
· Solids content:	0.0 %
· Change in condition	
· Evaporation rate	Not determined.

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:** strong oxidizing agents
- **Hazardous decomposition products:** carbon dioxide, carbon monoxide

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

64-17-5 ethanol

Oral	LD50	10,470 mg/kg (rat) OECD Test Guideline 401
Inhalative	LC50/4 h	117–125 mg/l (rat) OECD 403 (rat)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** Irritating effect.

(Contd. on page 7)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 6)

- **Sensitization:** No sensitizing effects known.
 - **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant
 - **Interactive effects** No interactive effects between components are known.
 - **Carcinogenic categories**
- | | |
|---|---|
| · IARC (International Agency for Research on Cancer) | |
| 64-17-5 ethanol | 1 |
- **NTP (National Toxicology Program)**
- | |
|------------------------------------|
| None of the ingredients is listed. |
|------------------------------------|
- **OSHA-Ca (Occupational Safety & Health Administration)**
- | |
|------------------------------------|
| None of the ingredients is listed. |
|------------------------------------|
- **Alternative sources for toxicological information**
No non-standard sources for toxicological information where used.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects**
- **Additional ecological information:**
- **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

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.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

- **UN-Number**
- **DOT, IMDG, IATA** UN1170

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 7)

<ul style="list-style-type: none"> · UN proper shipping name · DOT · IMDG · IATA 	Ethanol solutions ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION) Ethanol solution
<ul style="list-style-type: none"> · Transport hazard class(es) · DOT 	
<ul style="list-style-type: none"> · Class · Label 	3 Flammable liquids 3
<ul style="list-style-type: none"> · IMDG, IATA 	
<ul style="list-style-type: none"> · Class · Label 	3 Flammable liquids 3
<ul style="list-style-type: none"> · Packing group · DOT, IMDG, IATA 	II
<ul style="list-style-type: none"> · Environmental hazards: 	Not applicable.
<ul style="list-style-type: none"> · Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code 	Not applicable.
<ul style="list-style-type: none"> · Transport/Additional information: · DOT · Quantity limitations 	On passenger aircraft/rail: 5 L On cargo aircraft only: 60 L
<ul style="list-style-type: none"> · IMDG · Limited quantities (LQ) · Excepted quantities (EQ) 	1L Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
<ul style="list-style-type: none"> · IATA · Remarks: 	When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.
<ul style="list-style-type: none"> · Special precautions for user · Hazard identification number (Kemler code): · EMS Number: 	Warning: Flammable liquids 33 F-E,S-D

(Contd. on page 9)

US

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 8)

· Stowage Category	A
· UN "Model Regulation":	UN 1170 ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION), 3, II

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.

- **Sara**

- **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

- **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

- **TSCA (Toxic Substances Control Act):**

64-17-5 ethanol

ACTIVE

- **Hazardous Air Pollutants**

None of the ingredients is listed.

- **Chemicals known to cause cancer:**

None of the ingredients is listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

- **Chemicals known to cause developmental toxicity:**

64-17-5 ethanol

- **Carcinogenic categories**

- **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

- **TLV (Threshold Limit Value)**

64-17-5 ethanol

A3

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients is listed.

- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

All chemicals may pose unknown hazards and should be used with caution. This SDS applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of these data. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

- **Department issuing SDS:** Environment protection department.

(Contd. on page 10)

Safety Data Sheet

acc. to OSHA HCS

Date of issue: 03/25/2025

Revision date 03/25/2025

Trade name: 4-hydroxy Nonenal Mercapturic Acid

(Contd. from page 9)

· Contact: -**· Date of previous version** 10/13/2022**· Date of preparation** 03/25/2025**· Abbreviations and acronyms:**

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

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)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

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

Flammable liquids 2: Flammable liquids – Category 2

Eye irritation 2A: Serious eye damage/eye irritation – Category 2A

· * Data compared to the previous version altered.

US