

SAFETY DATA SHEET

Version 6.11 Revision Date 09/06/2024 Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Hydrogen fluoride pyridine

Product Number : 184225 Brand : Aldrich CAS-No. : 62778-11-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption

(40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by

MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-

527-3887 CHEMTREC (International) 24

Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 2), H300 Acute toxicity, Inhalation (Category 2), H330 Acute toxicity, Dermal (Category 1), H310 Skin corrosion (Category 1A), H314

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Serious eye damage (Category 1), H318 Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 **GHS Label elements, including precautionary statements**

Pictogram

Signal Word Danger

Hazard Statements

Fatal if swallowed, in contact with skin or if inhaled. H300 + H310 + H330

Causes severe skin burns and eye damage. H314

H402 Harmful to aquatic life.

Precautionary Statements

P260 Do not breathe mist or vapors.

P262 Do not get in eyes, on skin, or on clothing.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product. P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

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

protection.

P284 Wear respiratory protection.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P302 + P350 + P310 IF ON SKIN: Gently wash with plenty of soap and water.

Immediately call a POISON CENTER or doctor/ physician. P303 + P361 + P353

IF ON SKIN (or hair): Take off immediately all contaminated

clothing. Rinse skin with water/ shower.

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable

for breathing. Immediately call a POISON CENTER/ doctor.

IF IN EYES: Rinse cautiously with water for several minutes. P305 + P351 + P338 + P310

Remove contact lenses, if present and easy to do. Continue

rinsing. Immediately call a POISON CENTER/ doctor. P362 Take off contaminated clothing and wash before reuse.

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal

plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 **Mixtures**

> Synonyms : HF-Pyridine

> > Pyridine hydrofluoride

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Formula : C5H6FN Molecular weight : 99.11 g/mol

Component		Classification	Concentration
Hydrofluoric acid			
CAS-No. EC-No. Index-No.	7664-39-3 231-634-8 009-002-00-6	Acute Tox. 2; Acute Tox. 1; Skin Corr. 1A; Eye Dam. 1; H300, H330, H310, H314, H318 Concentration limits: >= 7 %: Skin Corr. 1A, H314; 1 - < 7 %: Skin Corr. 1B, H314; 0.1 - < 1 %: Eye Irrit. 2, H319;	>= 70 - < 90 %
Pyridine			
CAS-No. EC-No. Index-No. Registration number	110-86-1 203-809-9 613-002-00-7 01-2119493105-40- XXXX	Flam. Liq. 2; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; H225, H302, H332, H312, H315, H319	>= 30 - < 50 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Hydrofluoric (HF) acid burns require immediate and specialized first aid and medical treatment. Symptoms may be delayed up to 24 hours depending on the concentration of HF. After decontamination with water, further damage can occur due to penetration/absorption of the fluoride ion. Treatment should be directed toward binding the fluoride ion as well as the effects of exposure. Skin exposures can be treated with a 2.5% calcium gluconate gel repeated until burning ceases. More serious skin exposures may require subcutaneous calcium gluconate except for digital areas unless the physician is experienced in this technique, due to the potential for tissue injury from increased pressure. Absorption can readily occur through the subungual areas and should be considered when undergoing decontamination. Prevention of absorption of the fluoride ion in cases of ingestion can be obtained by giving milk, chewable calcium carbonate tablets or Milk of Magnesia to conscious victims. Conditions such as hypocalcemia, hypomagnesemia and cardiac arrhythmias should be monitored for, since they can occur after exposure. Countermeasurements must be implemented at once. First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. Keep respiratory tract clear. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

After contact with skin: Rinse with plenty of water for at least 10 minutes. Immediately remove contaminated clothes. Apply calcium gluconate gel (preparation: boil 5 g of calcium gluconate in 85 ml of hot distilled water, add 10 g glycerol. Allow 5 g of Carmellose-sodium

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to swell in the hot solution. Stable for 6 months, store in a cool place) and massage into the skin until the pain subsides, in between rinse with water and apply fresh gel. Continue gel therapy for another 15 minutes after the pain has subsided. If no calcium gluconate gel is available, apply several dressings thoroughly moistened with 20 % calcium gluconate solution. Medical advice absolutely required!

In case of eye contact

After contact with eyes: Rinse with plenty of water keeping eyelids open, protecting the unaffected eye (at least 10 minutes). Seek medical advice immediately! Remove contact lenses.

If swallowed

After swallowing: Immediately give to drink plenty of water, add calcium (in the form of calcium gluconate or calcium lactate). Caution: In the case of vomiting risk of perforation! Administer more calcium gluconate solution. Laxative: Sodium sulfate (1 tablespoon/1/4 l water). Seek medical advice immediately. Ensure that injured persons remain calm and protect them against heat loss.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

Note for the doctor: It is recommended to consult a doctor with experience in the treatment of lesions caused by hydrofluoric acid. If a systemic effect is suspected, monitoring and treatment in an intensive care unit is urgently required. Caution, ventricular fibrillation due to electrolyte imbalance.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Nitrogen oxides (NOx)

Hydrogen fluoride

Mixture with combustible ingredients.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® HF, Merck Art. No. 101591). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage stabilityRecommended storage temperature

-20 °C

Do not store in glass

Storage class

Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis	
Hydrofluoric acid	7664-39-3	TWA	0.5 ppm	USA. ACGIH Threshold Limit Values (TLV)	
	Remarks	Danger of cutaneous absorption		ption	
		С	2 ppm	USA. ACGIH Threshold Limit Values (TLV)	
		Danger of cutaneous absorption		ption	
		С	6 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits	
		TWA	3 ppm 2.5 mg/m3	USA. NIOSH Recommended Exposure Limits	
		TWA	3 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		PEL	0.4 ppm 0.33 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	
		Skin			
		STEL	1 ppm 0.83 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	
		Skin			
Pyridine	110-86-1	TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)	
		Confirmed animal carcinogen with unknown relevance to humans			
		TWA	5 ppm 15 mg/m3	USA. NIOSH Recommended Exposure Limits	
		TWA	5 ppm 15 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
		PEL	5 ppm 15 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	

Biological occupational exposure limits

Biological occupational exposure limits					
Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Hydrofluoric acid	7664-39-3	Fluoride	2 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to shift	(16 hours	after exposure cea	ases)
		Fluoride	3 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

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8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time: 120 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail

sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

protective clothing, Rubber or plastic boots

Respiratory protection

Recommended Filter type: Filter type ABEK

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid Color: colorless
 b) Odor No data available
 c) Odor Threshold No data available

d) pH No data available

e) Melting No data available point/freezing point

f) Initial boiling point No data available and boiling range

g) Flash point ()No data available
 h) Evaporation rate No data available
 i) Flammability (solid, gas)

j) Upper/lower No data available flammability or

explosive limits

k) Vapor pressure No data availablel) Vapor density No data available

m) Density 1.1 g/cm3 at 20 °C (68 °F) - lit.

Relative density No data available

n) Water solubility completely miscible

o) Partition coefficient: No data available

n-octanol/water
p) Autoignition No data available

q) Decomposition No data available temperature

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Reacts dangerously with glass. no information available

10.5 Incompatible materials

Strong bases, Alkali metals, Strong oxidizing agents, Metals, Strong acids, Reacts violently with water., glass

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity

Acute toxicity estimate Oral - 7.28 mg/kg

(Calculation method)

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute toxicity estimate Inhalation - 4 h - 0.8444 mg/l - vapor(Calculation method)

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Acute toxicity estimate Dermal - 7.27 mg/kg

(Calculation method)

Skin corrosion/irritation

Remarks: Mixture causes severe burns.

Serious eye damage/eye irritation

Remarks: Mixture causes serious eye damage.

Risk of blindness!

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is

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identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is

identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is

on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

11.2 Additional Information

Material reacts with moisture on the skin, eyes, and mucous membranes to generate hydrogen fluoride. Hydrogen fluoride is extremely destructive and may cause deep progressive burns that induce subcutaneous tissues to become blanched and bloodless resulting in lesions of dead tissue that are slow to heal.

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Components

Hydrofluoric acid

Acute toxicity

Oral: No data available

LC50 Inhalation - Rat - 1 h - 1.34 mg/l - vapor

Remarks: (IUCLID)

Acute toxicity estimate Inhalation - 0.6 mg/l - vapor

(Expert judgment)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table

3.1/3.2)

Symptoms: burns of mucous membranes, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Resultant lesions may affect the following:,

bronchitis, Pneumonia, Lung edema

Inhalation: Corrosive to respiratory system.

Dermal: No data available

Skin corrosion/irritation Skin - Rabbit

Result: Causes burns. - 4 h

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(OECD Test Guideline 404)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table

3.1/3.2)

Remarks: Symptoms may be delayed.

Possible damages:

Necrosis

Tendency of poor wound-healing after penetration of the substance.

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Causes burns. (OECD Test Guideline 405)

Remarks: (IUCLID)

Remarks: Causes serious eye damage.

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

Test Type: Ames test

Test system: S. typhimurium

Result: negative

Test Type: Chromosome aberration test in vitro Test system: Chinese hamster ovary cells

Result: Positive results were obtained in some in vitro tests.

Species: Rat

Remarks: Cytogenetic analysis

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Acute inhalation toxicity - burns of mucous membranes, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Resultant lesions may affect following:, bronchitis, Pneumonia, Lung edema

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Pyridine

Acute toxicity

LD50 Oral - Rat - 1,500 mg/kg

Remarks: (ECHA)

Symptoms: Vomiting, Nausea

LC50 Inhalation - Rat - male - 4 h - 17.1 mg/l - vapor

(US-EPA)

Symptoms: mucosal irritations, Cough, Shortness of breath

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Aillipore iGM3

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LD50 Dermal - Rabbit - > 1,000 - 2,000 mg/kg (OECD Test Guideline 402) No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation - 24 h

(Draize Test)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Irritating to eyes. - 24 h

Remarks: (ECHA)

Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse

Result: negative

(OECD Test Guideline 429)

Germ cell mutagenicity

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: Chinese hamster lung cells

Result: negative

Method: OECD Test Guideline 475 Species: Mouse - male - Bone marrow

Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Acute oral toxicity - Vomiting, Nausea

Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture

No data available

12.2 Persistence and degradability

No data available

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12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

Components

Hydrofluoric acid

Toxicity to daphnia static test NOEC - Daphnia magna (Water flea) - 3.7 mg/l - 21

and other aquatic d

invertebrates(Chronic Remarks: (ECHA)

toxicity)

Pyridine

Toxicity to fish semi-static test EC50 - Danio rerio (zebra fish) - 560 - 1,000

mg/l - 96 h

(OECD Test Guideline 203)

Remarks: (in analogy to similar products)

Toxicity to daphnia EC50 - Daphnia magna (Water flea) - 320 mg/l - 48 h

and other aquatic (OECD Test Guideline 202)

invertebrates Remarks: (in analogy to similar products)

Toxicity to algae static test EC50 - Pseudokirchneriella subcapitata - 320 mg/l -

72 h

(OECD Test Guideline 201)

Remarks: (in analogy to similar products)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1790 Class: 8 (6.1) Packing group: I

Proper shipping name: Hydrofluoric acid Reportable Quantity (RQ): 142 lbs Reportable Quantity (RQ): 100 lbs Reportable Quantity (RQ): 1000 lbs Poison Inhalation Hazard: No

IMDG

UN number: 1790 Class: 8 (6.1) Packing group: I EMS-No: F-A, S-B

Proper shipping name: HYDROFLUORIC ACID

IATA

UN number: 1790 Class: 8 (6.1) Packing group: I

Proper shipping name: Hydrofluoric acid

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component	Calculated product
		RQ (lbs)	RQ (lbs)
Hydrofluoric acid	7664-39-3	100	142
Pyridine	110-86-1	100	100 (F005)
Pyridine	110-86-1	1000	1000 (D038)

SARA 304 Extremely Hazardous Substances Reportable Quantity

		_	
Components	CAS-No.	Component	Calculated product
		RQ (lbs)	RQ (lbs)
Hydrofluoric acid	7664-39-3	100	142

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
Hydrofluoric acid	7664-39-3	100

SARA 311/312 : Acute Health Hazard Hazards : Chronic Health Hazard

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SARA 313 : The following components are subject to reporting

levels established by SARA Title III, Section 313:

Hydrofluoric 7664-39-3 >= 70 - < 90 %

acid

Pyridine 110-86-1 >= 30 - < 50 %

US State Regulations

Massachusetts Right To Know

Hydrofluoric acid 7664-39-3 Pyridine 110-86-1

Pennsylvania Right To Know

Hydrofluoric acid 7664-39-3 Pyridine 110-86-1

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including Pyridine, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.



SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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