

# Crotonitrile, mixture of cis and trans

sc-239584



The Power to Question

## Material Safety Data Sheet

Hazard Alert Code  
Key:

EXTREME

HIGH

MODERATE

LOW

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

Crotonitrile, mixture of cis and trans

### STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

### NFPA



### SUPPLIER

Santa Cruz Biotechnology, Inc.  
2145 Delaware Avenue  
Santa Cruz, California 95060  
800.457.3801 or 831.457.3800

### EMERGENCY

ChemWatch  
Within the US & Canada: 877-715-9305  
Outside the US & Canada: +800 2436 2255  
(1-800-CHEMCALL) or call +613 9573 3112

### SYNONYMS

C4-H5-N, CH<sub>3</sub>CH=CHCN, 2-butenenitrile, "crotonic nitrile", 1-cyanopropene, beta-methylacrylonitrile, "1-propenyl cyanide", "crotonitrile (sic)"

## Section 2 - HAZARDS IDENTIFICATION

### CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	3		
Toxicity	3		
Body Contact	2		
Reactivity	1		
Chronic	2		

Min/Nil=0  
Low=1  
Moderate=2  
High=3  
Extreme=4



### CANADIAN WHMIS SYMBOLS



## **EMERGENCY OVERVIEW**

### **RISK**

Contact with acids liberates very toxic gas.  
Harmful by inhalation, in contact with skin and if swallowed.  
Irritating to eyes, respiratory system and skin.  
Highly flammable.  
May cause long-term adverse effects in the environment.

### **POTENTIAL HEALTH EFFECTS**

#### **ACUTE HEALTH EFFECTS**

##### **SWALLOWED**

- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- Nitrile poisoning exhibits similar symptoms to poisoning due to hydrogen cyanide.  
The substances irritate the eyes and skin, and are absorbed quickly and completely through the skin.
- Cyanide poisoning can cause increased saliva output, nausea without vomiting, anxiety, confusion, vertigo, dizziness, stiffness of the lower jaw, convulsions, spasm, paralysis, coma and irregular heartbeat, and stimulation of breathing followed by failure.  
Often the skin becomes cyanosed (blue-grey), and this is often delayed.

##### **EYE**

- This material can cause eye irritation and damage in some persons.

##### **SKIN**

- Skin contact with the material may be harmful; systemic effects may result following absorption.
- This material can cause inflammation of the skin on contact in some persons.
- The material may accentuate any pre-existing dermatitis condition.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

##### **INHALED**

- Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
- The material can cause respiratory irritation in some persons.  
The body's response to such irritation can cause further lung damage.
- Inhalation hazard is increased at higher temperatures.

#### **CHRONIC HEALTH EFFECTS**

- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Chronic exposure to cyanides and certain nitriles may result in interference to iodine uptake by thyroid gland and its consequent enlargement. This occurs following metabolic conversion of the cyanide moiety to thiocyanate. Thyroid insufficiency may also occur as a result of metabolic conversion of cyanides to the corresponding thiocyanate. Exposure to small amounts of cyanide compounds over long periods are reported to cause loss of appetite, headache, weakness, nausea, dizziness, abdominal pain, changes in taste and smell, muscle cramps, weight loss, flushing of the face, persistent runny nose and irritation of the upper respiratory tract and eyes. These symptoms are not specific to cyanide exposure and therefore the existence of a chronic cyanide toxicity remains speculative. Repeated minor contact with cyanides produce a characteristic rash with itching, papules (small, superficial raised spots on the skin) and possible sensitisation. Concerns have been expressed that low-level, long term exposures may result in damage to the nerves of the eye.

### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
Crotononitrile, mixture of cis and trans	4786-20-3	>98
may contain		
<a href="#">isocrotononitrile</a>	1190-76-7	

### Section 4 - FIRST AID MEASURES

#### SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.
- Urgent hospital treatment is likely to be needed.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.

#### EYE

If this product comes in contact with the eyes

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

#### SKIN

If skin contact occurs

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

#### INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

#### NOTES TO PHYSICIAN

- For cyanide intoxication (and for certain nitriles which produce cyanide ion)
- Signs symptoms of acute cyanide poisoning reflect cellular hypoxia and are often non-specific.
- Cyanosis may be a late finding.
- A bradycardic, hypertensive and tachypneic patient suggests poisoning especially if CNS and cardiovascular depression subsequently occurs.
- Immediate attention should be directed towards assisted ventilation, administration of 100% oxygen, insertion of intravenous lines and institution of cardiac monitoring.

### Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available
Specific Gravity (water=1)	0.824
Lower Explosive Limit (%)	Not available

### **EXTINGUISHING MEDIA**

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

### **FIRE FIGHTING**

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 1000 metres in all directions.

### **GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS**

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

Combustion products include carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), other pyrolysis products typical of burning organic material.

### **FIRE INCOMPATIBILITY**

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

## **Section 6 - ACCIDENTAL RELEASE MEASURES**

### **MINOR SPILLS**

Environmental hazard - contain spillage.

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.

### **MAJOR SPILLS**

Environmental hazard - contain spillage.

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.

## **Section 7 - HANDLING AND STORAGE**

### **PROCEDURE FOR HANDLING**

- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT allow clothing wet with material to stay in contact with skin

### **RECOMMENDED STORAGE METHODS**

- Glass container is suitable for laboratory quantities
- Packing as supplied by manufacturer.
- Plastic containers may only be used if approved for flammable liquid.
- Check that containers are clearly labelled and free from leaks.

- For low viscosity materials (i) Drums and jerry cans must be of the non-removable head type. (ii) Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C)
- For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)
- Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C)

#### STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- Keep containers securely sealed.

### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Peak ppm	Peak mg/m <sup>3</sup>	TWA F/CC	Notes
US - California Permissible Exposure Limits for Chemical Contaminants	crotononitrile (Cyanide, as CN)		5						
US - Minnesota Permissible Exposure Limits (PELs)	crotononitrile (Cyanides (as CN))			5					
Canada - British Columbia Occupational Exposure Limits	crotononitrile (Cyanide salts, as CN)						C 5		Skin
US - Idaho - Limits for Air Contaminants	crotononitrile (Cyanides (as CN))		5						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	crotononitrile (Cyanides (as CN))		5						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	crotononitrile (Cyanides (as CN))		5						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	crotononitrile (Cyanides (as CN))		5						
US - Alaska Limits for Air Contaminants	crotononitrile (Cyanides (as CN))		5						
US - Hawaii Air Contaminant Limits	crotononitrile (Cyanides (as CN))		5						(CAS (Varies with compound))

US - Washington Permissible exposure limits of air contaminants	crotononitrile (Cyanide (as CN))	5	10	
US - Oregon Permissible Exposure Limits (Z-1)	crotononitrile (Cyanides (as CN))	- 5		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	crotononitrile (Cyanides (as CN))	5		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	crotononitrile (Cyanides (as CN))		10	11
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	crotononitrile (Cyanides (as CN))	5		

The following materials had no OELs on our records

- isocrotononitrile CAS1190-76-7

### PERSONAL PROTECTION



### RESPIRATOR

•Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

### EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

### HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

### OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.

- Eyewash unit.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

### ENGINEERING CONTROLS

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Does not mix with water.

Floats on water.

Contact with acids liberates very toxic gas.

State	LIQUID	Molecular Weight	67.09
Melting Range (°F)	-62	Viscosity	Not Available
Boiling Range (°F)	248- 250	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	61(CC)	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	0.824
Lower Explosive Limit (%)	Not available	Relative Vapour Density (air=1)	2.3
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

### APPEARANCE

Liquid; does not mix well with water. Soluble in acetone, ether. May discolour on storage

## Section 10 - CHEMICAL STABILITY

### CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

### STORAGE INCOMPATIBILITY

- Contact with acids produces toxic fumes
- Nitriles may polymerise in the presence of metals and some metal compounds.
- They are incompatible with acids; mixing nitriles with strong oxidising acids can lead to extremely violent reactions.
- Nitriles are generally incompatible with other oxidising agents such as peroxides and epoxides.
- The combination of bases and nitriles can produce hydrogen cyanide. Nitriles are hydrolysed exothermally in both aqueous acid and base to give carboxylic acids (or salts of carboxylic acids).
- The covalent cyano group is endothermic and many organic nitriles are reactive under certain conditions; N-cyano derivatives are reactive or unstable.
- The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation.

- Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds.

BREThERICK L. Handbook of Reactive Chemical Hazards.

- Avoid reaction with oxidising agents, bases and strong reducing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

## Section 11 - TOXICOLOGICAL INFORMATION

crotononitrile

### TOXICITY AND IRRITATION

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound.

### CROTONONITRILE

### ISOCROTONONITRILE

### CARCINOGEN

crotononitrile	US - Rhode Island Hazardous Substance List	IARC
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### SKIN

crotononitrile	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
crotononitrile	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin	Skin	X
crotononitrile	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	X
crotononitrile	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
crotononitrile	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
crotononitrile	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
crotononitrile	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X
crotononitrile	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
crotononitrile	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S

## Section 12 - ECOLOGICAL INFORMATION

May cause long-term adverse effects in the environment.

This material and its container must be disposed of as hazardous waste.

## Section 13 - DISPOSAL CONSIDERATIONS

### US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Reactivity characteristic: use EPA hazardous waste number D003 (waste code R).

### Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

- Containers may still present a chemical hazard/ danger when empty.



- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

#### Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	3
Identification Numbers:	UN1992	PG:	II
Label Codes:	3, 6.1	Special provisions:	IB2, T7, TP2, TP13
Packaging: Exceptions:	150	Packaging: Non-bulk:	202
Packaging: Exceptions:	150	Quantity limitations: Passenger aircraft/rail:	1 L
Quantity Limitations: Cargo aircraft only:	60 L	Vessel stowage: Location:	B
Vessel stowage: Other:	40	S.M.P.:	YES

Hazardous materials descriptions and proper shipping names:

Flammable liquids, toxic, n.o.s.

**Air Transport IATA:**

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	6.1
UN/ID Number:	1992	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	364	Maximum Qty/Pack:	60 L
Passenger and Cargo		Passenger and Cargo	

Packing Instructions:	352	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y341	Maximum Qty/Pack:	1 L
Shipping Name: FLAMMABLE LIQUID, TOXIC, N.O.S. *(CONTAINS CROTONONITRILE)			
<b>Maritime Transport IMDG:</b>			
IMDG Class:	3	IMDG Subrisk:	6.1
UN Number:	1992	Packing Group:	II
EMS Number:	F-E,S-D	Special provisions:	274
Limited Quantities:	1 L		
Shipping Name: FLAMMABLE LIQUID, TOXIC, N.O.S.(contains crotononitrile)			

### Section 15 - REGULATORY INFORMATION

**crotononitrile (CAS: 4786-20-3) is found on the following regulatory lists;**

"Canada Non-Domestic Substances List (NDSL)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

**Regulations for ingredients**

**isocrotononitrile (CAS: 1190-76-7) is found on the following regulatory lists;**

"US Department of Transportation (DOT), Hazardous Material Table"

### Section 16 - OTHER INFORMATION

#### LIMITED EVIDENCE

■ Cumulative effects may result following exposure\*.

\* (limited evidence).

#### Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes
crotononitrile	4786- 20- 3	Xn; R22
isocrotononitrile	1190- 76- 7	Xn; R22

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at:  
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

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Issue Date: Apr-11-2010

Print Date:Nov-22-2011