

ALFAAL03362

## Crotonaldehyde, predominantly trans

### SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**产品说明:**  
**Product Description:** 丁烯醛, 主要为反式  
 Crotonaldehyde, predominantly trans

**Cat No. :** L03362  
**Synonyms** (E)-2-Butenal  
**CAS No** 4170-30-3  
**Molecular Formula** C4 H6 O

**Supplier** Avocado Research Chemicals Ltd.  
 (Part of Thermo Fisher Scientific)  
 Shore Road, Heysham  
 Lancashire, LA3 2XY,  
 United Kingdom  
 Office Tel: +44 (0) 1524 850506  
 Office Fax: +44 (0) 1524 850608

**Emergency Telephone Number** For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11  
 Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99  
**CHEMTREC** Tel. No. **US**:001-800-424-9300 / **Europe**:001-703-527-3887

**E-mail address** begel.sdsdesk@thermofisher.com

**Recommended Use** Laboratory chemicals.  
**Uses advised against** All other uses

### SECTION 2. HAZARD IDENTIFICATION

**Physical State**  
Liquid

**Appearance**  
Clear

**Odor**  
pungent

#### Emergency Overview

Highly flammable liquid and vapor. Toxic if swallowed. Fatal in contact with skin. Causes skin irritation. Causes serious eye damage. Fatal if inhaled. May cause respiratory irritation. Suspected of causing genetic defects. May cause damage to organs through prolonged or repeated exposure. Very toxic to aquatic life with long lasting effects. Air sensitive. Lachrymator (substance which increases the flow of tears).

#### Classification of the substance or mixture

Flammable liquids.	Category 2
Acute Oral Toxicity	Category 3
Acute Dermal Toxicity	Category 1
Acute Inhalation Toxicity - Vapors	Category 2
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 1
Germ Cell Mutagenicity	Category 2
Specific target organ toxicity - (single exposure)	Category 3
Specific target organ toxicity - (repeated exposure)	Category 2
Acute aquatic toxicity	Category 1
Chronic aquatic toxicity	Category 1

# SAFETY DATA SHEET

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### Label Elements



### Signal Word

**Danger**

### Hazard Statements

H225 - Highly flammable liquid and vapor  
H301 - Toxic if swallowed  
H315 - Causes skin irritation  
H318 - Causes serious eye damage  
H335 - May cause respiratory irritation  
H341 - Suspected of causing genetic defects  
H373 - May cause damage to organs through prolonged or repeated exposure  
H410 - Very toxic to aquatic life with long lasting effects  
H310 + H330 - Fatal in contact with skin or if inhaled

### Precautionary Statements

#### Prevention

P201 - Obtain special instructions before use  
P202 - Do not handle until all safety precautions have been read and understood  
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking  
P240 - Ground and bond container and receiving equipment  
P241 - Use explosion-proof electrical/ ventilating/ lighting equipment  
P242 - Use non-sparking tools  
P243 - Take action to prevent static discharges  
P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
P262 - Do not get in eyes, on skin, or on clothing  
P264 - Wash face, hands and any exposed 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  
P284 - Wear respiratory protection  
P280 - Wear protective gloves/protective clothing/eye protection/face protection

#### Response

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower  
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing  
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P310 - Immediately call a POISON CENTER or doctor  
P330 - Rinse mouth  
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish  
P362 + P364 - Take off contaminated clothing and wash it before reuse

#### Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed  
P405 - Store locked up

#### Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

### Physical and Chemical Hazards

Highly flammable. Vapors may cause flash fire or explosion.

### Health Hazards

Toxic if swallowed. Fatal in contact with skin. Causes skin irritation. Corrosive. Causes eye burns. Fatal if inhaled. May cause respiratory irritation. Suspected of causing genetic defects. May cause damage to organs through prolonged or repeated exposure.

### Environmental hazards

Very toxic to aquatic life with long lasting effects. Will likely be mobile in the environment due to its water solubility. The product is water soluble, and may spread in water systems.

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**Other Hazards**

Lachrymator (substance which increases the flow of tears)  
This product does not contain any known or suspected endocrine disruptors.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Component	CAS No	Weight %
Crotonaldehyde	4170-30-3	> 95

**SECTION 4. FIRST AID MEASURES****Eye Contact**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

**Skin Contact**

Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

**Inhalation**

Remove to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

**Ingestion**

Do NOT induce vomiting. Call a physician or poison control center immediately.

**Most important symptoms and effects**

Difficulty in breathing. Causes eye burns. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

**Self-Protection of the First Aider**

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

**Notes to Physician**

Treat symptomatically.

**SECTION 5. FIRE-FIGHTING MEASURES****Suitable Extinguishing Media**

Water spray, carbon dioxide (CO<sub>2</sub>), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

**Extinguishing media which must not be used for safety reasons**

No information available.

**Specific Hazards Arising from the Chemical**

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Do not allow run-off from fire-fighting to enter drains or water courses.

**Protective Equipment and Precautions for Firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

**SECTION 6. ACCIDENTAL RELEASE MEASURES****Personal Precautions**

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Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

### Environmental Precautions

Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional Ecological Information. Avoid release to the environment. Collect spillage.

### Methods for Containment and Clean Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

Refer to protective measures listed in Sections 8 and 13.

## SECTION 7. HANDLING AND STORAGE

### Handling

Use only under a chemical fume hood. Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use spark-proof tools and explosion-proof equipment. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

### Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. Store under an inert atmosphere. Reacts with air to form peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals.

### Specific Use(s)

Use in laboratories

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control Parameters

Component	China	Taiwan	Thailand	Hong Kong
Crotonaldehyde	Ceiling: 12 mg/m <sup>3</sup>	TWA: 2 ppm TWA: 5.7 mg/m <sup>3</sup>		-

Component	ACGIH TLV	OSHA PEL	NIOSH	The United Kingdom	European Union
Crotonaldehyde	Ceiling: 0.3 ppm Skin	(Vacated) TWA: 2 ppm (Vacated) TWA: 6 mg/m <sup>3</sup> TWA: 2 ppm TWA: 6 mg/m <sup>3</sup>	IDLH: 50 ppm TWA: 2 ppm TWA: 6 mg/m <sup>3</sup>	-	

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

### Monitoring methods

BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS70 General methods for sampling airborne gases and vapours MDHS 88 Volatile organic compounds in air. Laboratory method using diffusive samplers, solvent desorption and gas chromatography MDHS 96 Volatile organic compounds in air - Laboratory method using pumped solid sorbent tubes, solvent desorption and gas chromatography

### Exposure Controls

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### Engineering Measures

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

### Personal protective equipment

**Eye Protection** Goggles (European standard - EN 166)

**Hand Protection** Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Butyl rubber	< 120 minutes	0.7 mm	Level 41	As tested under EN374-3 Determination of Resistance to Permeation by Chemicals
Nitrile rubber			EN 374	
Neoprene				
Natural rubber				
PVC				

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.

(Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure

**Respiratory Protection** When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.  
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

**Large scale/emergency use** Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced  
**Recommended Filter type:** Organic gases and vapours filter Type A Brown conforming to EN14387

**Small scale/Laboratory use** Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.  
**Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141  
When RPE is used a face piece Fit Test should be conducted

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

**Environmental exposure controls** Prevent product from entering drains. Do not allow material to contaminate ground water system. Local authorities should be advised if significant spillages cannot be contained.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	Clear
<b>Physical State</b>	Liquid
<b>Odor</b>	pungent
<b>Odor Threshold</b>	0.0210 mg/l
<b>pH</b>	No information available
<b>Melting Point/Range</b>	-74 °C / -101.2 °F
<b>Softening Point</b>	No data available
<b>Boiling Point/Range</b>	101 - 103 °C / 213.8 - 217.4 °F @ 760 mmHg

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<b>Flash Point</b>	13 °C / 55.4 °F	<b>Method -</b> CC (closed cup)
<b>Evaporation Rate</b>	No data available	
<b>Flammability (solid,gas)</b>	Not applicable	Liquid
<b>Explosion Limits</b>	<b>Lower</b> 2.1 vol% <b>Upper</b> 15.5 vol%	
<b>Vapor Pressure</b>	40 mbar @ 20 °C	
<b>Vapor Density</b>	2.41	(Air = 1.0)
<b>Specific Gravity / Density</b>	0.858	
<b>Bulk Density</b>	Not applicable	Liquid
<b>Water Solubility</b>	150 g/l (20°C)	
<b>Solubility in other solvents</b>	No information available	
<b>Partition Coefficient (n-octanol/water)</b>		
<b>Autoignition Temperature</b>	155 °C / 311 °F	DIN 51794
<b>Decomposition Temperature</b>	No data available	
<b>Viscosity</b>	0.27 mPa*s @ 20°C	Calculated
<b>Explosive Properties</b>	Not applicable	(no chemical groups associated with explosive properties) Vapors may form explosive mixtures with air (based on the chemical structure of the substance and oxidation states of the constituent elements)
<b>Oxidizing Properties</b>	Not applicable	
<b>Molecular Formula</b>	C4 H6 O	
<b>Molecular Weight</b>	70.09	

### SECTION 10. STABILITY AND REACTIVITY

<b>Stability</b>	Air sensitive.
<b>Hazardous Reactions</b>	May form explosive peroxides.
<b>Hazardous Polymerization</b>	Hazardous polymerization may occur.
<b>Conditions to Avoid</b>	Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition. Exposure to air.
<b>Materials to avoid</b>	Strong oxidizing agents. Strong reducing agents. Bases. Ammonia.

**Hazardous Decomposition Products** Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

### SECTION 11. TOXICOLOGICAL INFORMATION

#### Product Information

##### (a) acute toxicity;

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Crotonaldehyde	174 mg/kg (rat) OECD 420	26 mg/kg (Guinea pig)	336 mg/m <sup>3</sup> ( Rat ) 4h (OECD 403)

(b) skin corrosion/irritation; Category 2

(c) serious eye damage/irritation; Category 1

##### (d) respiratory or skin sensitization;

**Respiratory** Based on available data, the classification criteria are not met  
**Skin** Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Category 2

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**(f) carcinogenicity;** Based on available data, the classification criteria are not met  
 The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	EU	UK	Germany	IARC
Crotonaldehyde				Group 2B

**(g) reproductive toxicity;** Based on available data, the classification criteria are not met

**(h) STOT-single exposure;** Category 3  
**Results / Target organs** Respiratory system

**(i) STOT-repeated exposure;** Category 2  
**Target Organs** Nasal Cavities.

**(j) aspiration hazard;** Based on available data, the classification criteria are not met

**Symptoms / effects, both acute and delayed** Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity effects** The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Crotonaldehyde	LC50: = 0.84 mg/L, 96h flow-through (Pimephales promelas) LC50: = 3.5 mg/L, 96h static (Lepomis macrochirus) LC50: = 0.65 mg/L, 96h flow-through (Oncorhynchus mykiss)	EC50: = 2 mg/L, 48h (Daphnia magna)		EC50 = 20 mg/L 48 h

**Persistence and Degradability** Readily biodegradable  
**Persistence** Soluble in water, Persistence is unlikely, based on information available.  
**Degradation in sewage treatment plant** Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

**Bioaccumulative Potential** Bioaccumulation is unlikely; Bioaccumulation is unlikely

**Mobility in soil** The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility Highly mobile in soils

**Endocrine Disruptor Information** This product does not contain any known or suspected endocrine disruptors  
**Persistent Organic Pollutant** This product does not contain any known or suspected substance  
**Ozone Depletion Potential** This product does not contain any known or suspected substance

## SECTION 13. DISPOSAL CONSIDERATIONS

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**Waste from Residues/Unused Products**

Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

**Contaminated Packaging**

Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

**Other Information**

Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Can be landfilled or incinerated, when in compliance with local regulations. Do not empty into drains. Do not let this chemical enter the environment.

### SECTION 14. TRANSPORT INFORMATION

**Road and Rail Transport**

**UN-No** UN1143  
**Proper Shipping Name** CROTONALDEHYDE  
**Hazard Class** 6.1  
**Subsidiary Hazard Class** 3  
**Packing Group** I

**IMDG/IMO**

**UN-No** UN1143  
**Proper Shipping Name** CROTONALDEHYDE  
**Hazard Class** 6.1  
**Subsidiary Hazard Class** 3  
**Packing Group** I

**IATA**

FORBIDDEN FOR IATA TRANSPORT

**UN-No** UN1143  
**Proper Shipping Name** CROTONALDEHYDE FORBIDDEN FOR IATA TRANSPORT  
**Hazard Class** 6.1  
**Subsidiary Hazard Class** 3  
**Packing Group** I

**Special Precautions for User** No special precautions required

### SECTION 15. REGULATORY INFORMATION

**International Inventories**

X = listed, China (IECSC), Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

Component	The Inventory of Hazardous Chemicals (2015 Edition)	List of dangerous goods GB 12268 - 2012	TCSI	IECSC	EINECS	TSCA	DSL	PICCS	ENCS	ISHL	AICS	KECL
Crotonaldehyde	X	X	X	X	224-030-0	X	X	X	X	X	X	KE-05-0370

**National Regulations**



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Component	Toxic Chemical Substances Control Act
Crotonaldehyde 4170-30-3 ( > 95 )	Class IV (1 wt%)

### SECTION 16. OTHER INFORMATION

**Prepared By** Health, Safety and Environmental Department  
**Creation Date** 02-Jun-2009  
**Revision Date** 23-Apr-2024  
**Revision Summary** New emergency telephone response service provider.

#### Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

First aid for chemical exposure, including the use of eye wash and safety showers.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

Fire prevention and fighting, identifying hazards and risks, static electricity, explosive atmospheres posed by vapours and dusts.

Chemical incident response training.

#### Legend

**CAS** - Chemical Abstracts Service

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**IECSC** - Chinese Inventory of Existing Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**ENCS** - Japanese Existing and New Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

**NZIoC** - New Zealand Inventory of Chemicals

**WEL** - Workplace Exposure Limit

**ACGIH** - American Conference of Governmental Industrial Hygienists

**DNEL** - Derived No Effect Level

**RPE** - Respiratory Protective Equipment

**LC50** - Lethal Concentration 50%

**NOEC** - No Observed Effect Concentration

**PBT** - Persistent, Bioaccumulative, Toxic

**TWA** - Time Weighted Average

**IARC** - International Agency for Research on Cancer

**PNEC** - Predicted No Effect Concentration

**LD50** - Lethal Dose 50%

**EC50** - Effective Concentration 50%

**POW** - Partition coefficient Octanol:Water

**vPvB** - very Persistent, very Bioaccumulative

**ICAO/IATA** - International Civil Aviation Organization/International Air Transport Association

**ADR** - European Agreement Concerning the International Carriage of Dangerous Goods by Road

**OECD** - Organisation for Economic Co-operation and Development

**BCF** - Bioconcentration factor

**IMO/IMDG** - International Maritime Organization/International Maritime Dangerous Goods Code

**MARPOL** - International Convention for the Prevention of Pollution from Ships

**ATE** - Acute Toxicity Estimate

**VOC** - (Volatile Organic Compound)

#### Key literature references and sources for data

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

#### Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

## End of Safety Data Sheet