

CROTONALDEHYDE (Min. 85%)

Safety Data Sheet

Supersedes: 26/08/2022

Revision: 1.3

Revision date: 12/12/2023

SECTION 1: Identification

1.1 Identification

Product form	:	Substance
Substance name	:	Crotonaldehyde
CAS No	:	4170-30-3
EC/ List No	:	224-030-0
Formula	:	C ₄ H ₆ O
Molecular weight	:	70.09 g/mol
Synonyms	:	2-Butenal. Crotylaldehyde, Crotonal, (E)-but-2-enal

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

Use of the substance/mixture	:	Chemical intermediate
		Rubber industry, Leather tanning

1.3 Details of the supplier of the safety data sheet

Godavari Biorefineries Ltd.
45/47, Somaiya bhavan,
Mahatma Gandhi Road,
Fort, Mumbai -400001, INDIA.
T 0091 22 22048272
Email: alka@somaiya.com
www.somaiya.com

1.4 Emergency telephone Number

Emergency number	:	0091 2423 279308
		0091 22 22048272 (Monday – Friday - 09.30 hrs to 18.00 hrs)

SECTION 2: Hazard(s) identification

GHS classification

2.1 Classification of the substance or mixture

H225	:	Flammable liquid, Category 2
H301	:	Acute toxicity, Category 3, Oral
H310	:	Acute toxicity, Category 1, Dermal
H312	:	Harmful in contact with skin.
H315	:	Skin irritation, Category 2
H318	:	Serious eye damage, Category 1
H330	:	Acute toxicity, Category 2, Inhalation
H335	:	Specific target organ toxicity - single exposure, Category 3
H341	:	Germ cell mutagenicity, Category 2
H373	:	Specific target organ toxicity - repeated exposure, Category 2
H400	:	Acute aquatic toxicity, Category 1
H410	:	Very toxic to aquatic life with long lasting effects.

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

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2.2 GHS labeling

Hazard pictograms (GHS)



GHS02

GHS05

GHS08

GHS06

GHS09

Signal word (GHS)

: Danger

Hazard statements (GHS)

- H225 : Highly Flammable liquid and vapor
- H301 : Toxic if swallowed.
- H310 : Fatal in contact with skin.
- H330 : Fatal if inhaled.
- H315 : Causes skin irritation.
- H318 : Causes serious eye damage.
- H341 : Suspected of causing genetic defects
- H335 : May cause respiratory irritation
- H373 : may cause damage to Nose through prolonged or repeated exposure to inhalation
- H400 : Very toxic to aquatic life

Precautionary statements (GHS)

- P201 : Obtain special instructions before use
- P202 : Do not handle until all safety precautions have been read and understood.
- P210 : Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P240 : Ground/bond container and receiving equipment.
- P241 : Use explosion-proof electrical/ ventilating/ lighting/ equipment.
- P242 : Use only non-sparking tools.
- P243 : Take precautionary measures against static discharge.
- P260 : Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
- 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.
- P281 : Use personal protective equipment as required.
- P301 + P310 + P330 : IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
- P303 + P361 + P353 : IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- P304 + P340 + P310 : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
- P305 + P351 + P338 + P310 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately. call a POISON CENTER/doctor.
- P370 + P378 : In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

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- P403 + P233 : Store in a well-ventilated place. Keep container tightly closed.
- P501 : Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

Other hazards not contributing to the classification.

2.4 Unknown acute toxicity

Not applicable.

SECTION 3: Composition/Information on ingredients

3.1. Substance

Substance type		Mono-constituent	
Name	Product identifier CAS No EC No Index No	Concentration %	GHS classification
Crotonaldehyde (Main constituent)	4170-30-3 224-030-0 605-009-00-9	Minimum 85%	Flam. Liq. 2; Acute Tox. 3; Acute Tox. 2; Acute Tox. 3; Skin Irrit. 2; Eye Dam. 1; Muta. 2; STOT SE 3; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H225, H301, H330, H310, H315, H318, H341, H335, H373, H400 M-Factor - Aquatic Acute: 10

Full text of hazard classes and H-statements: see section 16

3.2 Mixture

Not applicable.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General information : Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital.
- Inhalation : Remove the victim into fresh air. Immediately consult a doctor/medical service.
- Skin contact : Wash immediately with lots of water (15 minutes)/shower. Do not apply (chemical) neutralizing agents. Remove clothing while washing. Do not remove clothing if it sticks to the skin. Cover wounds with sterile bandage. Consult a doctor/medical service.
- Eye contact : Rinse immediately with plenty of water for 15 minutes. Do not apply neutralizing agents. Take victim to an ophthalmologist.
- Ingestion : Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Do not induce vomiting. Do not give activated charcoal. Immediately consult a doctor/medical service. Ingestion of large quantities: immediately to hospital. Do not give chemical antidote. Doctor: gastric lavage is not recommended

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms/injuries after inhalation : Irritation of the respiratory tract and nasal mucous membranes. Coughing. EXPOSURE TO HIGH CONCENTRATIONS: Corrosion of the upper respiratory tract.
- Symptoms/injuries after skin contact : Corrosion of the skin.
- Symptoms/injuries after eye contact : Corrosion of the eye tissue. Permanent eye damage.

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- Symptoms/injuries after ingestion : Burns to the gastric/intestinal mucosa. Risk of aspiration pneumonia
- Chronic symptoms : On continuous / repeated exposure: Red skin. Slight irritation. Inflammation/damage of the eye tissue. Dry/sore throat. Possible inflammation of the respiratory tract.

4.3 Indication of any immediate medical attention and special treatment needed

Seek medical assistance.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Water spray. Polyvalent foam. Alcohol-resistant foam. BC powder. Carbon dioxide.
- Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2 Special hazards arising from the substance or mixture

- Fire hazard : DIRECT FIRE HAZARD. Flammable. Gas/vapor flammable with air within explosion limits. INDIRECT FIRE HAZARD. May be ignited by sparks
- Explosion hazard : DIRECT EXPLOSION HAZARD. Gas/vapour explosive with air within explosion limits. INDIRECT EXPLOSION HAZARD. may be ignited by sparks
- Reactivity : On heating: release of corrosive/combustible gases/vapours (acetic acid vapours). Upon combustion: CO and CO₂ are formed. Violent to explosive reaction with many compounds e.g.: with (strong) oxidizers:

5.3 Advice for firefighters

- Firefighting instructions : Cool tanks/drums with water spray/remove them into safety location. Do not move the load if exposed to heat. Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.
- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

5.4 Additional information

Be Use water spray to cool unopened containers

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

- Protective equipment : Gas-tight chemical suit. Corrosion-proof suit. Refer "Material-Handling" to select protective clothing.
- Emergency procedures : Keep upwind. Mark the danger area. Consider evacuation. Seal off low-lying areas. Close doors and windows of adjacent premises. Stop nearby engines and no smoking. No naked flames or sparks. Use Spark- and explosion-proof appliances and lighting equipment. Keep containers closed.
Wash contaminated clothes.

For emergency responders

- Protective equipment : Equip cleanup crew with proper protection.
- Emergency procedures : Stop leak if safe to do so. Ventilate area.

6.2 Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers, water bodies.

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6.3 Methods and material for containment and cleaning up

- | | | |
|-------------------------|---|--|
| For containment | : | Contain released substance, transfer (pump) into suitable containers. Use compatible material of containers. Try to reduce evaporation. Measure the concentration of the explosive gas-air mixture. Dilute combustible/toxic gases/vapours with water spray. Provide equipment/receptacles with earthing. Do not use compressed air for pumping over spills. |
| Methods for cleaning up | : | Take up liquid spill into inert absorbent material, e.g.: sand, earth, vermiculite, powdered limestone. Scoop absorbed substance into closing containers. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/ authorized disposal facility. Wash clothing and equipment after handling. |

6.4 Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- | | | |
|-------------------------------|---|--|
| Precautions for safe handling | : | Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Keep the substance free from contamination. Use corrosion proof equipment. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Do not use compressed air for pumping over. Use spark-/explosionproof appliances and lighting system.
Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Keep container tightly closed.
Measure the concentration in the air regularly. Work under local exhaust/ventilation. Exhaust gas must be neutralised. |
| Hygiene measures | : | Do not eat, drink or smoke when using this product. Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. |

7.2 Conditions for safe storage, including any incompatibilities

- | | | |
|-------------------------------|---|---|
| Storage temperature | : | Keep tightly closed in a dry, cool and well-ventilated place. |
| Heat-ignition | : | KEEP SUBSTANCE AWAY FROM: heat sources. ignition sources. |
| Prohibitions on mixed storage | : | KEEP SUBSTANCE AWAY FROM: combustible materials. oxidizing agents. (strong) bases. metals. alcohols. amines. water/moisture. |
| Storage area | : | Store in a dry area. Ventilation at floor level. Keep out of direct sunlight. Fireproof storeroom. Keep locked up. Meet the legal requirements. |
| Special rules on packaging | : | SPECIAL REQUIREMENTS: closing. dry. clean. correctly labelled. meet the legal requirements. Secure fragile packaging's in solid containers. |

7.3 Specific end uses

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

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Crotonaldehyde (4170-30-3)

- | | | | |
|-------|---|-------------------------------------|---|
| ACGIH | : | ACGIH TWA (ppm) | 0.3 ppm (Time-weighted average exposure limit 8 h; TLV - Adopted Value) |
| ACGIH | : | ACGIH STEL (ppm) | No data available |
| OSHA | : | OSHA PEL (TWA) (mg/m ³) | 6 mg/m ³ |

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OSHA	:	OSHA PEL (TWA) (ppm)	2 ppm
IDLH	:	NIOSH IDLH (ppm)	50 ppm
NIOSH	:	NIOSH REL (TWA) (mg/m ³)	6 mg/m ³
NIOSH	:	NIOSH REL (TWA) (ppm)	2 ppm
NIOSH	:	NIOSH REL (STEL) (mg/m ³)	6 mg/m ³
NIOSH	:	NIOSH REL (STEL) (ppm)	2 ppm

8.2 Exposure controls

Appropriate engineering controls	:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Material should be handled safely.
Personal protective equipment	:	<div style="display: flex; justify-content: space-around; align-items: center;">      </div> <p style="text-align: center;">Protective goggles. Gloves. Protective clothing. Face shield. Gas mask with filter.</p>
Materials for protective clothing	:	GIVE EXCELLENT RESISTANCE: butyl rubber. polyethylene/ethylene vinyl alcohol. viton. GIVE GOOD RESISTANCE: neoprene. GIVE LESS RESISTANCE: natural rubber. PVC. GIVE POOR RESISTANCE: polyethylene. PVA.
Hand protection	:	Gloves.
Eye protection	:	Safety glasses.
Skin and body protection	:	Head/neck protection. Corrosion-proof clothing.
Respiratory protection	:	Wear gas mask with filter type A if conc. in air > exposure limit. High vapour/ gas concentration: self-contained respirator.
Thermal hazard protection	:	None.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	:	Liquid
Appearance	:	Liquid
Colour	:	Colorless to yellowish
Odour	:	Pungent, 0.135 ppm(Threshold limit)
pH	:	No Data Available
Melting point	:	-76 °C
Freezing point	:	No Data Available
Initial boiling point/boiling range	:	81 - 82 °C
Flash Point	:	13 °C
Relative evaporation rate	:	No Data Available
Relative density	:	0.853 g/cm ³ (20 °C)
Relative vapour density at 20°C	:	2.41
Specific gravity/ density	:	0.853 g/cm ³ (20 °C)
Molecular mass	:	70.09 g/mol

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Flammability(Solid, Gas)	: No Data Available
Upper/lower flammability or Explosive limit	: No Data Available
Solubility	: 181 g/l Soluble in water
Vapor pressure	: 30mmHg (25 °C)
Vapour density	: No Data Available
Evaporation Rate	: No Data Available
Partition coefficient n-octanol/water	: 0.60 (Experimental value; 20 °C, n-octanol water)
Auto-ignition temperature	: 165 °C
Decomposition temperature	: No Data Available
Viscosity	: No Data Available
Explosive Limits	: No Data Available

9.2 Other information

Surface Tension	: No data available
Specific conductivity	: No data available
VOC content	: No data available
Other properties	: Gas/vapour heavier than air at 20°C. Clear. Hygroscopic. Volatile. Substance has acid reaction.

SECTION 10: Stability and reactivity

10.1 Reactivity	: On heating: release of corrosive/combustible gases/vapours . Upon combustion: CO and CO2 are formed. Violent to explosive reaction with many compounds e.g.: with (strong) oxidizers: (increased) risk of fire/explosion. Reacts violently with (some) bases. Reacts with (some) metals: release of highly flammable gases/vapours.
10.2 Chemical Stability	: No decomposition if used as directed. Stable under recommended storage conditions.
10.3 Possibility of hazardous reactions	: May form explosive peroxides Polymerization can occur Polymerization is a highly exothermic reaction and may generate sufficient heat to cause thermal decomposition and/or rupture containers.
10.4 Conditions to avoid	: Source of ignition and static discharge. Extremely high or low temperatures. Incompatible materials
10.5 Incompatible materials	: May react violently with Oxygen, oxidizing agents, reducing agents, acids, bases
10.6 Hazardous decomposition products	: Carbon dioxide. Carbon monoxide.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Likely routes of exposure	: Inhalation; Skin and eye contact
Acute toxicity	: Slightly toxic. Refer Hazard statements Section 16

Crotonaldehyde (4170-30-3)

LD50 oral toxicity	: 174 mg/kg body weight (Rat)
LD50 dermal toxicity	: 26 mg/kg body weight (guinea pig)
LC50 inhalation toxicity	: 336 mg/m ³ Exposure time: 4 h (Rat)
Skin corrosion/irritation	: Causes severe skin burns and eye damage.

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Serious eye damage/irritation	:	Causes serious eye damage.
Respiratory or skin sensitization	:	Non sensitizing
Germ cell mutagenicity	:	No data available.
In-vitro Mutagenicity	:	Ames Test: positive - with and without metabolic activation - Method: OECD 471 Cytogenicity Assay in Chinese hamster cells: positive - with and without metabolic activation - Method: OECD 473 DNA Damage and Repair in hepatocytes: positive -without metabolic activation - Method: OECD 487 In vitro Sister Chromatid Exchange Assay in Chinese Hamster Ovary (CHO): positive - with and without metabolic activation - Method: OECD 479***
In vivo Mutagenicity	:	Sex-linked Recessive Lethal Test in Drosophila Melanogaster: negative and positive results - Method: OECD 477 Mammalian Erythrocyte Micronucleus Test in mice: negative - Method: OECD 474 Mammalian Bone Marrow Chromosome Aberration Test in mice: positive - Method: OECD 475 Rodent Dominant Lethal test in mice: positive - Method: OECD 478 Mammalian Spermatogonial Chromosome Aberration Test in mice: positive - Method: OECD 483
Carcinogenicity	:	IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2-Butenal)
Reproductive toxicity	:	No toxicological effects to fertility or offspring Routes of exposure oral gavage*** Species Rat Method OECD 415 NOAEL 10 mg/kg body weight/day
Teratogenicity	:	No data available
Specific target organ toxicity (single exposure)	:	Inhalation - May cause respiratory irritation
Specific target organ toxicity (repeated exposure)	:	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	:	No data available

SECTION 12: Ecological information

12.1 Toxicity

Ecology - general	:	Classified as dangerous for the environment
Ecology - air	:	Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009). Not included in the list of substances which may contribute to the greenhouse effect (Regulation (EC) No 842/2006). TA-Luft Klasse 5.2.5/II.
Ecology – water	:	Very toxic to aquatic life

Crotonaldehyde (4170-30-3)

	Toxicity to Fish	Toxicity to aquatic plants	Toxicity to aquatic invertebrates	Toxicity to Microorganisms
Species	Oncorhynchus mykiss (rainbow trout)	Pseudokirchneriella subcapitata	Daphnia magna	Pseudomonas putida
Value	0.65 mg/l	< 0.881 mg/l	2 mg/l	10.4 mg/l
Exposure time	96 h	96h	48 h	16h

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12.2 Persistence and degradability

Persistence and degradability : Readily biodegradable in water. But failing in 10 day window.

12.3 Bio-accumulative potential

Bio-accumulative potential : Data not available

12.4 Mobility in soil

Ecology – soil : Data not available.

12.5 Other adverse effects

Very Toxic to aquatic life

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Remove and dispose waste in accordance with local and/or national regulations. Recommended practice of distillation, physico-chemical/biological treatment and authorized waste incinerator for solvents with energy recovery. Do not discharge into drains or the environment.

SECTION 14 : Transport Information

Marine transport (IMDG)

UN number : 1143
 Proper shipping name and description : Crotonaldehyde
 Class : 6.1
 Packaging group : I
 Hazard Identification Number : 663 (ECHA)
 EMS code : F-E, S-D
 Marine pollutant : Yes

Air transport ICAO/IATA

UN number : 1143
 Proper shipping name and description : Crotonaldehyde
 Class : 6.1
 Packaging group : I
 Hazard Labels : 6.1, 3
 Environmentally hazardous : Yes
 IATA Passenger : Not permitted for passenger transport

IATA Cargo : Not permitted for Cargo transport

Department of Transportation (DOT)

UN number : 1143
 Proper shipping name and description : Crotonaldehyde
 Class : 6.1
 Packaging group : I
 Reportable Quantity (RQ) : 100 lbs
 Poison Inhalation Hazard : Yes

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Hazard labels (DOT)

: 6.1 – Toxic

3 - Flammable liquid



SECTION 15: Regulatory information

15.1 National regulations

Country	National Inventories	Listing
AUSTRALIA	AICS	Listed
CANADA	DSL	Listed
CHINA	IECSC	Listed
EUROPE	EC	Listed
JAPAN	ENCS	Listed
NEWZEALAND	NZIoC	Listed
PHILIPPINES	PICCS	Listed
SOUTH KOREA	KECI	Listed
TAIWAN	TCSI	Listed
USA	TSCA	Listed

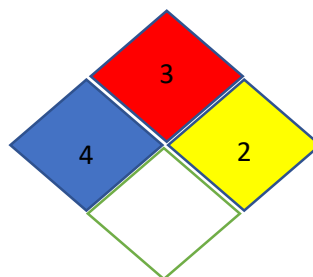
SECTION 16: Other information

16.1 Hazard Statement

H225	: Flammable liquid, Category 2
H301	: Acute toxicity, Category 3, Oral
H310	: Acute toxicity, Category 1, Dermal
H312	: Harmful in contact with skin.
H315	: Skin irritation, Category 2
H318	: Serious eye damage, Category 1
H330	: Acute toxicity, Category 2, Inhalation
H335	: Specific target organ toxicity - single exposure, Category 3
H341	: Germ cell mutagenicity, Category 2
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16.2 NFPA Rating

:



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16.3 Abbreviations and acronyms

- : PBT =Persistent Bioaccumulative and Toxic
- vPvB= Very Persistent and Very Bioaccumulative
- SCBA= Self Contained Breathing Apparatus
- NIOSH REL= National Institute for Occupational Safety and Health Recommended Exposure Limit
- OSHA PEL=Occupational Safety and Health Administration Permissible Exposure Limit
- OELTWA= Occupational Exposure Limit Time Weighted Averages
- IDLH= Immediately Dangerous to Life or Health
- UEL= Upper Explosive Limit
- LEL= Lower Explosive Limit
- RTECS= Registry of Toxic Effects of Chemical Substances
- NTP=National Toxicology Programm
- IARC= International Agency for Research on Cancer
- EPA=Environmental Protection Agency
- TSCA= Toxic Substances Control Act
- NFPA= National Fire Protection Association
- CSR=Chemical Safety Report
- BCF = Bio Concentration Factor
- DNEL = Derived No Effect Level
- PNEC = Predicted No Effect Concentration
- TLV = Threshold Limit Value
- ACGIH = American Conference of Governmental Industrial Hygienist
- REACH = Registration, Evaluation .Authorisation and Restriction of Chemicals
- CLP = Classification, Labelling and Packaging
- LD / LC = Lethal Doses / Lethal Concentration
- GHS = Globally Harmonised System
- ADR = Accord europeen relative au transport international de marchandises
- IMDG-Code = International Maritime Code for Dangerous Goods
- EmS = Emergency measures on Sea
- ICAO = International Civil Aviation Organization
- IATA/DGR= International Air Transport Association/Dangerous Goods Regulation

16.4 Further information:

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and Godavari Biorefineries Ltd. assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.