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

1.1 Product identifiers

Product name: Crotonaldehyde, predominantly trans

Product Number: 275212
Brand: Aldrich
Index-No.: 605-009-00-9
CAS-No.: 123-73-9

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

Identified uses: Laboratory chemicals, Synthesis of substances

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)

Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 1), H330
Acute toxicity, Dermal (Category 3), H311
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 2), H373
Short-term (acute) aquatic hazard (Category 1), H400

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

Aldrich - 275212
2.2 GHS Label elements, including precautionary statements

Pictogram

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard statement(s)</td>
<td></td>
</tr>
<tr>
<td>H225</td>
<td>Highly flammable liquid and vapor.</td>
</tr>
<tr>
<td>H301 + H311</td>
<td>Toxic if swallowed or in contact with skin.</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td>H330</td>
<td>Fatal if inhaled.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>H341</td>
<td>Suspected of causing genetic defects.</td>
</tr>
<tr>
<td>H351</td>
<td>Suspected of causing cancer.</td>
</tr>
<tr>
<td>H373</td>
<td>May cause damage to organs through prolonged or repeated exposure.</td>
</tr>
<tr>
<td>H400</td>
<td>Very toxic to aquatic life.</td>
</tr>
<tr>
<td>Precautionary statement(s)</td>
<td></td>
</tr>
<tr>
<td>P201</td>
<td>Obtain special instructions before use.</td>
</tr>
<tr>
<td>P202</td>
<td>Do not handle until all safety precautions have been read and understood.</td>
</tr>
<tr>
<td>P210</td>
<td>Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.</td>
</tr>
<tr>
<td>P233</td>
<td>Keep container tightly closed.</td>
</tr>
<tr>
<td>P240</td>
<td>Ground/bond container and receiving equipment.</td>
</tr>
<tr>
<td>P241</td>
<td>Use explosion-proof electrical/ ventilating/ lighting/ equipment.</td>
</tr>
<tr>
<td>P242</td>
<td>Use only non-sparking tools.</td>
</tr>
<tr>
<td>P243</td>
<td>Take precautionary measures against static discharge.</td>
</tr>
<tr>
<td>P260</td>
<td>Do not breathe mist or vapors.</td>
</tr>
<tr>
<td>P264</td>
<td>Wash skin thoroughly after handling.</td>
</tr>
<tr>
<td>P270</td>
<td>Do not eat, drink or smoke when using this product.</td>
</tr>
<tr>
<td>P271</td>
<td>Use only outdoors or in a well-ventilated area.</td>
</tr>
<tr>
<td>P273</td>
<td>Avoid release to the environment.</td>
</tr>
<tr>
<td>P280</td>
<td>Wear protective gloves/ protective clothing/ eye protection/ face protection.</td>
</tr>
<tr>
<td>P284</td>
<td>Wear respiratory protection.</td>
</tr>
<tr>
<td>P301 + P310 + P330</td>
<td>IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.</td>
</tr>
<tr>
<td>P303 + P361 + P353</td>
<td>IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.</td>
</tr>
<tr>
<td>P304 + P340 + P310</td>
<td>IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.</td>
</tr>
<tr>
<td>P305 + P351 + P338 + P310</td>
<td>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.</td>
</tr>
<tr>
<td>P308 + P313</td>
<td>IF exposed or concerned: Get medical advice/ attention.</td>
</tr>
<tr>
<td>P332 + P313</td>
<td>If skin irritation occurs: Get medical advice/ attention.</td>
</tr>
<tr>
<td>P362</td>
<td>Take off contaminated clothing and wash before reuse.</td>
</tr>
<tr>
<td>P370 + P378</td>
<td>In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.</td>
</tr>
<tr>
<td>P391</td>
<td>Collect spillage.</td>
</tr>
<tr>
<td>P403 + P233</td>
<td>Store in a well-ventilated place. Keep container tightly closed.</td>
</tr>
<tr>
<td>P403 + P235</td>
<td>Store in a well-ventilated place. Keep cool.</td>
</tr>
</tbody>
</table>
2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Lachrymator.

SECTION 3: Composition/information on ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2E)-2-Butenal</td>
<td>Flam. Liq. 2; Acute Tox. 3;</td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td></td>
<td>Acute Tox. 1; Acute Tox. 3;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin Irrit. 2; Eye Dam. 1; Muta. 2;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carc. 2; STOT SE 3; STOT RE 2;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquatic Acute 1; H225, H301, H330,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H311, H315, H318, H341, H351, H335,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H373, H400 M-Factor - Aquatic Acute:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

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
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. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.
If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

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
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
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
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

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
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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. Keep away from heat and sources of ignition. 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. Risk of explosion.

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 carefully with liquid-absorbent material (e.g. Chemizorb®). 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.

**Advice on protection against fire and explosion**
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

**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**
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

**Storage stability**
Recommended storage temperature
2 - 8 °C

**Storage class**
Storage class (TRGS 510): 3: Flammable liquids

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**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2E)-2-Butenal</td>
<td>123-73-9</td>
<td>TWA</td>
<td>2 ppm 6 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>0.3 ppm</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

**Remarks** Skin

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**
required

**Body Protection**
Flame retardant antistatic protective clothing.

**Respiratory protection**
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. Risk of explosion.

---

### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Form: liquid</td>
</tr>
<tr>
<td></td>
<td>Color: colorless</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>pungent</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Melting point/freezing point</strong></td>
<td>Melting point/range: -76 °C (-105 °F) - lit.</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range</strong></td>
<td>104 °C 219 °F - lit.</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>9 °C (48 °F) - closed cup</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>No data available</td>
</tr>
</tbody>
</table>
| **Upper/lower flammability or explosive limits** | Upper explosion limit: 19.5 % (V)  
  Lower explosion limit: 2.15 % (V) |
| **Vapor pressure**            | 43 hPa at 20 °C (68 °F)      |
|                               | 193 hPa at 55 °C (131 °F)    |
| **Vapor density**             | 2.42 - (Air = 1.0)           |
| **Density**                   | 0.846 g/mL at 25 °C (77 °F) |
|                               | - lit.                       |
| **Relative density**          | No data available            |
| **Water solubility**          | 425.4 g/l at 20 °C (68 °F)   |
| **Partition coefficient:**    | No data available            |
n-octanol/water

p) Autoignition temperature
No data available

q) Decomposition temperature
No data available

r) Viscosity
No data available

s) Explosive properties
No data available

t) Oxidizing properties
none

9.2 Other safety information
Relative vapor density
2.42 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
Vapors may form explosive mixture with air.

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
Heat.
Warming.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 240 mg/kg
LC50 Inhalation - Rat - 4 h - 0.3 mg/l - vapor

Dermal: No data available
LD50 Subcutaneous - Rat - 140 mg/kg
Behavioral: Convulsions or effect on seizure threshold.

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available
Respiratory or skin sensitization
No data available

Germ cell mutagenicity
In vitro tests showed mutagenic effects

Carcinogenicity
IARC: 2B - Group 2B: Possibly carcinogenic to humans ((2E)-2-Butenal)
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
RTECS: GP9625000
To the best of our knowledge, the chemical, physical, and toxicological properties have not
been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

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
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. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

**DOT (US)**
- UN number: 1143
- Class: 6.1I (3)
- Packing group: I
- Proper shipping name: Crotonaldehyde, stabilized
- Reportable Quantity (RQ): 100 lbs
- Poison Inhalation Hazard: Hazard Zone B

**IMDG**
- UN number: 1143
- Class: 6.1 (3)
- Packing group: I
- Proper shipping name: CROTONALDEHYDE, STABILIZED
- Marine pollutant: yes

**IATA**
- UN number: 1143
- Class: 6.1 (3)
- Proper shipping name: Crotonaldehyde
- IATA Passenger: Not permitted for transport
- IATA Cargo: Not permitted for transport

SECTION 15: Regulatory information

**SARA 302 Components**
(2E)-2-Butenal
- CAS-No.: 123-73-9
- Revision Date: 2007-07-01

**SARA 313 Components**
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**
No components are subject to the Massachusetts Right to Know Act.
SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. 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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Version: 6.5 Revision Date: 07/23/2022 Print Date: 12/20/2023