

# CROTONALDEHYDE

CTA

| CAUTIONARY RESPONSE INFORMATION  |  |        |          | 7. SHIPPING INFORMATION  |                                  |  |  |
|--|--|--------|----------|--|----------------------------------|--|--|
| Common Synonyms<br>Crotonaldehyde<br>Crotonic aldehyde<br>beta-Methylacrolein<br>trans-2-Butenal   | Watery liquid  | Yellow | Tar odor | 7.1 Grades of Purity: 98.0%  | 7.2 Storage Temperature: Ambient |  |  |
| Floats and mixes slowly with water. Flammable, irritating vapor is produced.   |  |        |          | 7.3 Inert Atmosphere: No requirement                                       | 7.4 Venting: Pressure-vacuum     |  |  |
| Keep people away. Avoid contact with liquid and vapor.<br>Avoid inhalation.<br>Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).<br>Shut off ignition sources and call fire department.<br>Stay upwind and use water spray to "knock down" vapor.<br>Notify local health and pollution control agencies.<br>Protect water intakes. |  |        |          | 7.5 IMO Pollution Category: A  | 7.6 Ship Type: 2                 |  |  |
|  |  |        |          | 7.7 Barge Hull Type: 2   |                                  |  |  |
|  |  |        |          | 8. HAZARD CLASSIFICATIONS  |                                  |  |  |
|  |  |        |          | 8.1 49 CFR Category: Poison  | 8.2 49 CFR Class: 6.1            |  |  |
|  |  |        |          | 8.3 49 CFR Package Group: I  | 8.4 Marine Pollutant: Yes        |  |  |
|  |  |        |          | 8.5 NFPA Hazard Classification:  |                                  |  |  |
|  |  |        |          | Category   | Classification                   |  |  |
|  |  |        |          | Health Hazard (Blue).....  | 4                                |  |  |
|  |  |        |          | Flammability (Red).....  | 3                                |  |  |
|  |  |        |          | Instability (Yellow).....  | 2                                |  |  |
|  |  |        |          | 8.6 EPA Reportable Quantity: 100 pounds                                    |                                  |  |  |
|  |  |        |          | 8.7 EPA Pollution Category: B  | 8.8 RCRA Waste Number: U053      |  |  |
|  |  |        |          | 8.9 EPA FWCPC List: Yes  |                                  |  |  |
|  |  |        |          | 9. PHYSICAL & CHEMICAL PROPERTIES  |                                  |  |  |
|  |  |        |          | 9.1 Physical State at 15°C and 1 atm: Liquid                               |                                  |  |  |
|  |  |        |          | 9.2 Molecular Weight: 70.09  |                                  |  |  |
|  |  |        |          | 9.3 Boiling Point at 1 atm: 216.0°F = 102.2°C = 375.4°K                    |                                  |  |  |
|  |  |        |          | 9.4 Freezing Point: -100°F = -75°C = 198°K                                 |                                  |  |  |
|  |  |        |          | 9.5 Critical Temperature: 563.0°F = 295°C = 568.2°K                        |                                  |  |  |
|  |  |        |          | 9.6 Critical Pressure: 630 psia = 43 atm = 4.4 MN/m²                       |                                  |  |  |
|  |  |        |          | 9.7 Specific Gravity: 0.852 at 20°C (liquid)                               |                                  |  |  |
|  |  |        |          | 9.8 Liquid Surface Tension: Currently not available                        |                                  |  |  |
|  |  |        |          | 9.9 Liquid Water Interfacial Tension: Currently not available              |                                  |  |  |
|  |  |        |          | 9.10 Vapor (Gas) Specific Gravity: 2.4                                     |                                  |  |  |
|  |  |        |          | 9.11 Ratio of Specific Heats of Vapor (Gas): 1.104                         |                                  |  |  |
|  |  |        |          | 9.12 Latent Heat of Vaporization: 200 Btu/lb = 111 cal/g = 4.65 X 10⁵ J/kg |                                  |  |  |
|  |  |        |          | 9.13 Heat of Combustion: -14,000 Btu/lb = -7760 cal/g = -325 X 10⁵ J/kg    |                                  |  |  |
|  |  |        |          | 9.14 Heat of Decomposition: Not pertinent                                  |                                  |  |  |
|  |  |        |          | 9.15 Heat of Solution: Not pertinent                                       |                                  |  |  |
|  |  |        |          | 9.16 Heat of Polymerization: Not pertinent                                 |                                  |  |  |
|  |  |        |          | 9.17 Heat of Fusion: Currently not available                               |                                  |  |  |
|  |  |        |          | 9.18 Limiting Value: Currently not available                               |                                  |  |  |
|  |  |        |          | 9.19 Reid Vapor Pressure: 1.5 psia   |                                  |  |  |
|  |  |        |          | NOTES  |                                  |  |  |
| 1. CORRECTIVE RESPONSE ACTIONS<br>Dilute and disperse<br>Stop discharge<br>Clean shore line  | 2. CHEMICAL DESIGNATIONS<br>2.1 CG Compatibility Group: 19; Aldehyde<br>2.2 Formula: CH <sub>2</sub> CH=CHCHO<br>2.3 IMO/UN Designation: 3.2/1143<br>2.4 DOT ID No.: 1143<br>2.5 CAS Registry No.: 4170-30-3<br>2.6 NAERG Guide No.: 131P<br>2.7 Standard Industrial Trade Classification: 51621 |        |          |  |                                  |  |  |
| 3. HEALTH HAZARDS  |  |        |          |  |                                  |  |  |
| 3.1 Personal Protective Equipment: Air-supplied mask for concentrations above 2% by volume; plastic gloves; monogoggles; eye bath and safety shower  |  |        |          |  |                                  |  |  |
| 3.2 Symptoms Following Exposure: INHALATION: vapor is exceedingly irritating, causing coughing, chest pain, nausea, vomiting, and collapse. CONTACT WITH SKIN OR EYES: may cause burns and systemic illness. Contact of liquid or vapor with eyes causes burns.  |  |        |          |  |                                  |  |  |
| 3.3 Treatment of Exposure: INHALATION: remove victim to fresh air; give oxygen if breathing is difficult; call a physician. INGESTION: have victim drink water or milk; do NOT induce vomiting. SKIN OR EYES: immediately flush with plenty of water for at least 15 min; physician should see cases of eye irritation from vapor or liquid.                                   |  |        |          |  |                                  |  |  |
| 3.4 TLV-TWA: 2 ppm   |  |        |          |  |                                  |  |  |
| 3.5 TLV-STEL: Not listed.  |  |        |          |  |                                  |  |  |
| 3.6 TLV-Ceiling: Not listed.   |  |        |          |  |                                  |  |  |
| 3.7 Toxicity by Ingestion: Grade 3; LD <sub>50</sub> = 50 to 500 mg/kg   |  |        |          |  |                                  |  |  |
| 3.8 Toxicity by Inhalation: Currently not available.   |  |        |          |  |                                  |  |  |
| 3.9 Chronic Toxicity: Currently not available  |  |        |          |  |                                  |  |  |
| 3.10 Vapor (Gas) Irritancy Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.  |  |        |          |  |                                  |  |  |
| 3.11 Liquid or Solid Characteristics: Fairly severe skin irritant; may cause pain and second-degree burns after a few minutes contact.   |  |        |          |  |                                  |  |  |
| 3.12 Odor Threshold: 0.13 ppm  |  |        |          |  |                                  |  |  |
| 3.13IDLH Value: 50 ppm   |  |        |          |  |                                  |  |  |
| 3.14 OSHA PEL-TWA: 2 ppm   |  |        |          |  |                                  |  |  |
| 3.15 OSHA PEL-STEL: Not listed.  |  |        |          |  |                                  |  |  |
| 3.16 OSHA PEL-Ceiling: Not listed.   |  |        |          |  |                                  |  |  |
| 3.17 EPA AEGL: Not listed  |  |        |          |  |                                  |  |  |

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| 9.20<br>SATURATED LIQUID DENSITY |                       | 9.21<br>LIQUID HEAT CAPACITY |                                     | 9.22<br>LIQUID THERMAL CONDUCTIVITY |   | 9.23<br>LIQUID VISCOSITY   |            |
|----------------------------------|-----------------------|------------------------------|-------------------------------------|-------------------------------------|---|----------------------------|------------|
| Temperature<br>(degrees F)       | Pounds per cubic foot | Temperature<br>(degrees F)   | British thermal unit per<br>pound-F | Temperature<br>(degrees F)          | British thermal unit inch<br>per hour-square foot-F | Temperature<br>(degrees F) | Centipoise |
| 40                               | 54.160                | 85                           | 0.547                               | 32                                  | 1.040   | 32                         | 1.041      |
| 50                               | 53.810                | 90                           | 0.552                               | 34                                  | 1.040   | 34                         | 1.021      |
| 60                               | 53.460                | 95                           | 0.557                               | 36                                  | 1.040   | 36                         | 1.001      |
| 70                               | 53.110                | 100                          | 0.562                               | 38                                  | 1.040   | 38                         | 0.982      |
| 80                               | 52.770                | 105                          | 0.567                               | 40                                  | 1.040   | 40                         | 0.964      |
| 90                               | 52.420                | 110                          | 0.572                               | 42                                  | 1.040   | 42                         | 0.945      |
| 100                              | 52.070                | 115                          | 0.577                               | 44                                  | 1.040   | 44                         | 0.928      |
| 110                              | 51.730                | 120                          | 0.582                               | 46                                  | 1.040   | 46                         | 0.911      |
| 120                              | 51.380                | 125                          | 0.587                               | 48                                  | 1.040   | 48                         | 0.894      |
| 130                              | 51.030                | 130                          | 0.592                               | 50                                  | 1.040   | 50                         | 0.878      |
| 140                              | 50.690                | 135                          | 0.597                               | 52                                  | 1.040   | 52                         | 0.862      |
| 150                              | 50.340                | 140                          | 0.602                               | 54                                  | 1.040   | 54                         | 0.846      |
| 160                              | 49.990                | 145                          | 0.607                               | 56                                  | 1.040   | 56                         | 0.831      |
| 170                              | 49.650                | 150                          | 0.612                               | 58                                  | 1.040   | 58                         | 0.817      |
| 180                              | 49.300                |                              |                                     | 60                                  | 1.040   | 60                         | 0.802      |
| 190                              | 48.950                |                              |                                     | 62                                  | 1.040   | 62                         | 0.788      |
| 200                              | 48.610                |                              |                                     | 64                                  | 1.040   | 64                         | 0.775      |
| 210                              | 48.260                |                              |                                     | 66                                  | 1.040   | 66                         | 0.762      |
|                                  |                       |                              |                                     |                                     |   | 68                         | 0.749      |
|                                  |                       |                              |                                     |                                     |   | 70                         | 0.736      |
|                                  |                       |                              |                                     |                                     |   | 72                         | 0.724      |
|                                  |                       |                              |                                     |                                     |   | 74                         | 0.712      |
|                                  |                       |                              |                                     |                                     |   | 76                         | 0.700      |
|                                  |                       |                              |                                     |                                     |   | 78                         | 0.689      |
|                                  |                       |                              |                                     |                                     |   | 80                         | 0.677      |

| 9.24<br>SOLUBILITY IN WATER |                                   | 9.25<br>SATURATED VAPOR PRESSURE |                        | 9.26<br>SATURATED VAPOR DENSITY |                       | 9.27<br>IDEAL GAS HEAT CAPACITY |                                     |
|-----------------------------|-----------------------------------|----------------------------------|------------------------|---------------------------------|-----------------------|---------------------------------|-------------------------------------|
| Temperature<br>(degrees F)  | Pounds per 100 pounds<br>of water | Temperature<br>(degrees F)       | Pounds per square inch | Temperature<br>(degrees F)      | Pounds per cubic foot | Temperature<br>(degrees F)      | British thermal unit per<br>pound-F |
| 68                          | 15.500                            | 40                               | 0.241                  | 40                              | 0.00315               | 0                               | 0.275                               |
|                             |                                   | 50                               | 0.335                  | 50                              | 0.00429               | 25                              | 0.285                               |
|                             |                                   | 60                               | 0.458                  | 60                              | 0.00575               | 50                              | 0.294                               |
|                             |                                   | 70                               | 0.617                  | 70                              | 0.00760               | 75                              | 0.304                               |
|                             |                                   | 80                               | 0.820                  | 80                              | 0.00992               | 100                             | 0.314                               |
|                             |                                   | 90                               | 1.076                  | 90                              | 0.01279               | 125                             | 0.323                               |
|                             |                                   | 100                              | 1.396                  | 100                             | 0.01629               | 150                             | 0.332                               |
|                             |                                   | 110                              | 1.791                  | 110                             | 0.02053               | 175                             | 0.341                               |
|                             |                                   | 120                              | 2.274                  | 120                             | 0.02561               | 200                             | 0.350                               |
|                             |                                   | 130                              | 2.858                  | 130                             | 0.03165               | 225                             | 0.359                               |
|                             |                                   | 140                              | 3.561                  | 140                             | 0.03877               | 250                             | 0.368                               |
|                             |                                   | 150                              | 4.397                  | 150                             | 0.04709               | 275                             | 0.377                               |
|                             |                                   | 160                              | 5.386                  | 160                             | 0.05675               | 300                             | 0.385                               |
|                             |                                   | 170                              | 6.547                  | 170                             | 0.06789               | 325                             | 0.394                               |
|                             |                                   | 180                              | 7.901                  | 180                             | 0.08065               | 350                             | 0.402                               |
|                             |                                   | 190                              | 9.470                  | 190                             | 0.09517               | 375                             | 0.410                               |
|                             |                                   | 200                              | 11.280                 | 200                             | 0.11160               | 400                             | 0.418                               |
|                             |                                   | 210                              | 13.350                 | 210                             | 0.13010               | 425                             | 0.426                               |
|                             |                                   | 220                              | 15.700                 | 220                             | 0.15080               | 450                             | 0.434                               |
|                             |                                   | 230                              | 18.370                 | 230                             | 0.17400               | 475                             | 0.442                               |
|                             |                                   | 240                              | 21.390                 | 240                             | 0.19960               | 500                             | 0.449                               |
|                             |                                   | 250                              | 24.770                 | 250                             | 0.22790               | 525                             | 0.457                               |
|                             |                                   | 260                              | 28.560                 | 260                             | 0.25910               | 550                             | 0.464                               |
|                             |                                   | 270                              | 32.770                 | 270                             | 0.29320               | 575                             | 0.471                               |
|                             |                                   | 280                              | 37.440                 | 280                             | 0.33050               | 600                             | 0.478                               |