Chemical Safety Data Sheet MSDS / SDS

Acrylaldehyde SDS

Revision Date:2024-04-25 Revision Number:1

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

Product identifier

Product name:	Acrylaldehyde
CAS:	107-02-8

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

Relevant identified uses:	For R&D use only. Not for medicinal, household or other use.
Uses advised against:	none

Company Identification

Company:	Chemicalbook.in
Address:	5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090
Telephone:	+91 9550333722

SECTION 2: Hazards identification

Classification of the substance or mixture

Flammable liquids, Category 2
Acute toxicity - Category 2, Oral

Acute toxicity - Category 3, Dermal
Skin corrosion, Sub-category 1B
Acute toxicity - Category 1, Inhalation
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour
H300 Fatal if swallowed
H311 Toxic in contact with skin
H314 Causes severe skin burns and eye damage
H330 Fatal if inhaled
H410 Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
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.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
P273 Avoid release to the environment.

Response

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower].
P370+P378 In case of fire: Use ... to extinguish.
P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P316 Get emergency medical help immediately.
P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P363 Wash contaminated clothing before reuse.
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.
P320 Specific treatment is urgent (see ... on this label).
P391 Collect spillage.

Storage

P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	Acrylaldehyde
Common names and synonyms:	Acrylaldehyde
CAS number:	107-02-8

EC number:	203-453-4
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

Most important symptoms/effects, acute and delayed

Extremely toxic; probable oral human lethal dose is 5-50 mg/kg, between 7 drops and one teaspoon for a 70 kg (150 lb.) person. Inhalation of air containing 10 ppm of acrolein may be fatal in a few minutes. Death from cardiac failure accompanied by hyperemia and hemorrhage of the lungs and degeneration of the bronchial epithelium is possible. Acrolein causes acute respiratory and eye irritation; severe gastrointestinal distress with slowly developing pulmonary edema (lungs fill up with fluid); and skin irritation. (EPA, 1998)

Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Acrolein and related compounds

SECTION 5: Firefighting measures

Suitable extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

Specific hazards arising from the chemical

Under fire conditions, polymerization may occur. If inside a container, violent rupture of the container may take place. When heated to decomposition, it emits highly toxic fumes. Alkalis or strong acids act as catalysts, causing a condensation reaction and liberating energy. Reaction may be very rapid and violent. Readily converted by oxygen to hazardous peroxides and acids. Unstable, avoid exposure to alkalis, strong acids, oxygen, elevated temperatures, such as fire conditions. (Polymerization inside container could cause violent rupture of container under fire conditions.) (EPA, 1998)

Special protective actions for fire-fighters

Use alcohol-resistant foam. Use powder. Use carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

ACCIDENTAL RELEASE MEASURES: Personal precautions, protective equipment and emergency procedures: Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. Methods and materials for containment and cleaning up: Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Use non-sparking handtools. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Fireproof. Separated from strong oxidants, strong bases, strong acids and food and feedstuffs. Cool. Ventilation along the floor. Store only if stabilized.Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Recommended storage temperature 2 - 8 deg C. Store under inert gas. Handle and open container with care. Light sensitive. Heat- and air-sensitive. Storage class (TRGS 510): Flammable liquids.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 0.1 ppm as TWA; (ceiling value): (skin); A4 (not classifiable as a human carcinogen).MAK: carcinogen category: 3B.EU-OEL: 0.05 mg/m3, 0.02 ppm as TWA; 0.12 mg/m3, 0.05 ppm as STEL

Biological limit values

no data available

Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Liquid.
Colour:	Colorless or yellowish liquid
Odour:	Extremely sharp; extremely acrid, pungent, burnt sweet; hot fat
Melting point/freezing point:	-87.7 °C.
Boiling point or initial boiling point and boiling range:	52.6 °C. Atm. press.:1 013 hPa.
Flammability:	Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
Lower and upper explosion limit/flammability limit:	Lower flammable limit: 2.8% by volume; Upper flammable limit: 31% by volume
Flash point:	-26 °C.
Auto-ignition temperature:	220 °C.
Decomposition temperature:	no data available
pH:	6.
Kinematic viscosity:	dynamic viscosity (in mPa s) = 0.35. Temperature:20°C.

Solubility:	greater than or equal to 100 mg/mL at 70° F (NTP, 1992)
Partition coefficient n-octanol/water:	log Pow = -0.01.
Vapour pressure:	Ca. 293 hPa. Temperature:20 °C.
Density and/or relative density:	0.84 g/cm3. Temperature:20 °C.
Relative vapour density:	1.94 (vs air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

The substance can form explosive peroxides. The substance may polymerize. This generates fire or explosion hazard. Decomposes on heating. Upon heating, toxic fumes are formed. This produces toxic fumes. Reacts with strong acids, strong bases and strong oxidants. This generates fire and explosion hazard.

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Dangerous fire hazard when exposed to heat, flame, or oxidizers.The vapour is heavier than air and may travel along the ground; distant ignition possible.ACROLEIN can react violently with oxidizing agents. Polymerizes exothermically on contact with small amounts of acids (including sulfur dioxide), alkalis, volatile amines and pyridines, salts, thiourea, oxidizing agents (air) and on exposure to light and heat. Polymerization initiated by amines and pyridines occurs after a deceptive induction period. Water solutions of mineral acids and metal ions can initiate polymerization. The inhibitor (usually hydroquinone) greatly reduces tendency to polymerize. Undergoes Diels-Alder reaction with itself to give acrolein dimer. This can become a runaway reaction at 90°C [Kirk-Othmer, 4th Ed, Vol. 1]. Mixing in equal molar portions with any of the following substances in a closed container caused the temperature and pressure to increase: 2-aminoethanol, ammonium hydroxide, chlorosulfonic acid, ethylenediamine, ethyleneimine [NFPA 1991].

Conditions to avoid

no data available

Incompatible materials

Incompatible materials: Oxidizing agents, oxygen, bases, strong acids.

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions - Carbon oxides.

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 - mouse (male) - 13.9 mg/kg bw.

Inhalation: LC50 - hamster, Syrian (male/female) - 58 mg/m3 air (analytical).

Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Under the Draft Revised Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999), the potential carcinogenicity of acrolein cannot be determined because the existing "data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure." There are no adequate human studies of the carcinogenic potential of acrolein. Collectively, experimental studies provide inadequate evidence that acrolein causes cancer in laboratory animals. Specifically, two inhalation bioassays in laboratory animals are inadequate to make a determination because of protocol limitations. Two gavage bioassays failed to show an acrolein-induced tumor response in 2 species of laboratory animals. Suggestive evidence of an extra-thoracic tumorigenic response in a drinking water study in female rats was not supported in the reanalysis of data by an independently-convened pathology working group. Questions were also raised about the accuracy of the reported levels of acrolein in the drinking water from this study. A skin tumor initiation-promotion study was negative, and the findings from an intraperitoneal injection study were of uncertain significance. Although acrolein has been shown to be capable of inducing sister chromatid exchange, DNA cross-linking and mutations under certain conditions, its highly reactive nature and the lack of tumor induction at portals of entry make it unlikely that acrolein reaches systemic sites at biologically-significant exposure levels. The observations of positive mutagenic results in bacterial systems occurred at high concentrations near the lethal dose. This evaluation replaces the cancer assessment for acrolein added to the IRIS database in 1988. Under the Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) applied at that time, acrolein was classified as a possible human carcinogen (Category C). The 1988 classification for acrolein was based on the increased incidence of adrenal cortical adenomas in female rats and carcinogenic potential of an acrolein metabolite, its mutagenicity in bacteria, and its structural relationship to probable or known human carcinogens. The updated cancer characterization considered new study results and reevaluated previous studies.

Reproductive toxicity

No information is available on the reproductive effects of acrolein in humans. In available reproductive animal studies, rats exposed to 0.55 to 4 ppm (1.3 - 9.2 milligrams per cubic meter) of acrolein by inhalation, showed no effects on the number of pregnancies, the number and weights of the fetuses, or the overall reproductive fitness of the animals. No studies were located regarding developmental effects in humans or animals after inhalation exposure to acrolein.

STOT-single exposure

Lachrymation. The substance is severely irritating to the eyes, skin and respiratory tract. Inhalation of high concentrations may cause lung oedema. See Notes. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

no data available

Aspiration hazard

A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50 - Pimephales promelas - 19.5 µg/L - 96 h.

Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna - 0.09 mg/L - 24 h.

Toxicity to algae: EC50 - Desmodesmus subspicatus (previous name: Scenedesmus subspicatus) - 0.026 mg/L - 72 h.

Toxicity to microorganisms: EC50 - Proteus vulgaris - 0.02 mg/L - 2 h.

Persistence and degradability

AEROBIC: The half-life of acrolein in natural unsterilized water was 29 hours compared with 43 hours in sterilized (thymol-treated) water suggesting that biodegradation was partially responsible for the degradation(1). A loss of 100% was observed when 5 and 10 mg/L acrolein underwent a static incubation in the dark at 25 deg C with sewage inoculum for 7 days(2). In another experiment, acrolein reached 30% of its theoretical BOD in river water after 100 hrs(3). It has been reported that acrolein is metabolized easily in soil, being mineralized to carbon dioxide(4). Results of other biodegradation screening studies also indicate that acrolein would be readily degraded by mixed microbial populations(5-7). In contrast, no BOD removal was observed during a 5-day BOD dilution test in which effluent from a biological waste treatment plant was used(8). Acrolein, present at 100 mg/L, reached 0% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test, however, the acrolein formed 3-hydroxypropanal in the water(9) which is the hydration reaction product of acrolein in water(10). Field and laboratory studies using irrigation channels suggested that the degradation of the hydration product of acrolein, 3-hydroxypropanal, occurs after the concentration of acrolein falls below 2-3 ppm. The degradation of 3-hydroxypropanal was also preceded by a 100-hour lag period, suggesting that biodegradation was occurring through the action of acclimated cultures(11). In a laboratory study conducted in an aerobic sandy loam soil from Phoenix AZ, acrolein was completely gone within 8 hours in the nonsterile soils and within 115 hours in the sterilized soil. The biotransformation half-life in the nonsterile soil was calculated to be 4.2 hours and four products/intermediates were identified: acrylic acid, 3-hydroxypropionic acid, 3-hydroxypropanal, and CO2(12). Transformation products (acrylic acid, 3-hydroxypropionic acid) were also readily biotransformed and were presumably converted to CO2 with a half-life of 29 days(12).

Bioaccumulative potential

An estimated BCF of 3 was calculated in fish for acrolein(SRC), using a log Kow of -0.01(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC). Results of BCF tests using carp (Cyprinus carpio) which were exposed to acrolein over an 8-week indicate the compound has low bioconcentration(4), however, actual BCF values were not reported(SRC). A log BCF of 2.54 (BCF = 347) was measured for acrolein in a bluegill sunfish based on the whole body weight(5). In another study, a BCF of 344 was measured for acrolein in bluegill sunfish(6). However, these measured values may be an overestimate since total (14)C was measured in the fish, which may have resulted in the measurement of acrolein metabolites(7).

Mobility in soil

Using a structure estimation method based on molecular connectivity indices(1), the Koc of acrolein can be estimated to be 1.0(SRC). According to a classification scheme(2), this estimated Koc value suggests that acrolein is expected to have very high mobility in soil.

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN1092 (For reference only, please check.)
IMDG: UN1092 (For reference only, please check.)
IATA: UN1092 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: ACROLEIN, STABILIZED (For reference only, please check.)
IMDG: ACROLEIN, STABILIZED (For reference only, please check.)
IATA: ACROLEIN, STABILIZED (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.)
IMDG: 6.1 (For reference only, please check.)
IATA: 6.1 (For reference only, please check.)

Packing group, if applicable

ADR/RID: I (For reference only, please check.)
IMDG: I (For reference only, please check.)
IATA: I (For reference only, please check.)

Environmental hazards

ADR/RID: Yes
IMDG: Yes
IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort.Rest and medical observation are therefore essential.Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered.An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.The odour warning when the exposure limit value is exceeded is insufficient.The occupational exposure limit value should not be exceeded during any part of the working exposure.Check for peroxides prior to distillation; render harmless if positive.