

Safety Data Sheet

1. Chemical product and company identification

Product name : Acetaldehyde

Company information

Name of manufacturer : KANTO CHEMICAL CO., INC.
 Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP
 Name of section : Business Administration Department, Reagent Division
 Telephone number : +81-3-6214-1090
 Facsimile number : +81-3-3241-1047
 Mail address : BC32@kanto.co.jp
 Reference No : 01004
 Recommended use : For research use only
 Restrictions on use : Seek expert judgment when using the product for applications other than those recommended.

2. Hazards identification

GHS classification

Physical hazards	Flammable liquids	Category 1
Health hazards	Acute toxicity (oral)	Category 4
	Acute toxicity (dermal)	Category 3
	Acute toxicity (inhalation:vapors)	Category 4
	Serious eye damage/eye irritation	Category 2A
	Skin sensitization	Category 1
	Germ cell mutagenicity	Category 2
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 1B
	Specific target organ toxicity (single exposure)	Category 1 (central nervous system, respiratory organs)
	Specific target organ toxicity (single exposure)	Category 3 (narcosis)
	Specific target organ toxicity (repeated exposure)	Category 1 (respiratory organs)
Environmental hazards	Aquatic acute	Category 3

Hazard pictograms



Signal word : Danger

Hazard statements : Extremely flammable liquid and vapor
 Harmful if swallowed or if inhaled
 Toxic in contact with skin
 May cause an allergic skin reaction



Causes serious eye irritation
May cause drowsiness or dizziness
Suspected of causing genetic defects
May cause cancer
May damage fertility or the unborn child
Causes damage to organs (central nervous system, respiratory organs)
Causes damage to organs (respiratory organs) through prolonged or repeated exposure
Harmful to aquatic life

Precautionary statements

- Prevention : Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground and bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take action to prevent static discharges.
Do not breathe mist/vapors.
Wash hands, forearms and face thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing should not be allowed out of the workplace.
Avoid release to the environment.
Wear protective gloves/protective clothing/eye protection/face protection.
- Response : IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
IF ON SKIN: Wash with plenty of water.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Call a POISON CENTER or doctor.
IF exposed or concerned: Get medical advice/attention.
Call a POISON CENTER or doctor if you feel unwell.
Get medical advice/attention if you feel unwell.
Rinse mouth.
If skin irritation or rash occurs: Get medical advice/attention.
If eye irritation persists: Get medical advice/attention.
Take off immediately all contaminated clothing and wash it before reuse.
Take off contaminated clothing and wash it before reuse.
- Storage : Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
- Disposal : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.



3. Composition/information on ingredients

Distinction of substance or mixture : Substance

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
Acetaldehyde	≥ 85	C ₂ H ₄ O	Listed	200-836-8	75-07-0

4. First aid measures

First aid measures

- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately get medical treatment.
- First-aid measures after skin contact : Remove contaminated clothing and the substance. Wash with plenty of water. If skin irritation or rash occurs, get medical attention.
- First-aid measures after eye contact : Wash the affected areas under running water for at least 15 minutes. If necessary, get medical treatment.
- First-aid measures after ingestion : The chemical is volatile. Do not induce vomiting because it increases the risk of aspiration into the lungs. Get medical attention immediately. If necessary, rinse mouth with water.
- Personal Protection in First Aid and Measures : Rescuers should wear proper protective equipment like rubber gloves, goggles.

5. Fire fighting measures

- Suitable extinguishing media : Water, dry chemical powder, carbon dioxide, dry sand, alcohol resistant foam
- Unsuitable extinguishing media : Foam extinguisher
- Firefighting instructions : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.
Fight fire from windward.
Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Alcohol-resistant foam extinguisher is effective for a large scale fire.
- Personal protection (Emergency response) : Wear breathing apparatus.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures

- General measures : Wear proper protective equipment and avoid contact with skin and inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

Environmental precautions

- Environmental precautions : Attention should be given to avoid discharge of spilled product into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated wastewater into the environment must be avoided.



Methods and Equipment for Containment and Cleaning up

- For containment : Absorb spill with inert material (e.g, diatomaceous earth, sand) and flush spillage area with copious amounts of water.
- Prevention Measures for Secondary Accidents : Remove nearby sources of ignition and prepare extinguishing media.

7. Handling and storage**Handling**

- Technical measures : Wear proper protective equipment to avoid contact with skin or inhalation of vapor.
Ventilate well at working places.
Use explosion-proof electric apparatus.
- Precautions for safe handling : Avoid formation of vapor and aerosols.
Do not allow contact with oxidizing substances.

Storage

- Storage conditions : Store in a dark, cool place and tightly closed.
- Material used in packaging/containers : Glass, fluorine resin.
Do not use vinyl chloride resin, acrylic resin, polystyrene etc.

8. Exposure controls / Personal protection equipment

ACGIH Ceiling	25 ppm
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- Appropriate engineering controls : Use with an enclosed system or a local exhaust ventilation.

Protective equipment

- Respiratory protection : Chemical cartridge respirator with an organic vapor cartage or airline respirator
- Hand protection : Impervious protective gloves
- Eye protection : Safety goggles
- Skin and body protection : Protective clothing, protective boots

9. Physical and chemical properties

- Physical state : Liquid
- Color : Colorless.
- Odor : Pungent.
- pH : No data available
- Melting point : -123.5 ° C
- Freezing point : No data available
- Boiling point : 21 ° C
- Flash point : -39 ° C (C.C.)
- Auto-ignition temperature : 185 ° C
- Decomposition temperature : No data available
- Flammability : Flammable
- Vapor pressure : 99 kPa (20°C)
- Relative density : 0.788 (16/4°C)



Density	: No data available
Relative gas density	: 1.52
Solubility	: Water: Readily soluble.
Partition coefficient n-octanol/water (log Pow)	: -0.34
Explosive limits (vol %)	: 4 - 57 vol %
Viscosity, kinematic	: No data available
Particle characteristics	: No data available

10. Stability and reactivity

Reactivity	: Reacts with sulfuric acid to produce paraldehyde. At temperatures below 0° C, metaldehyde is produced. Reacts with dilute alkali to produce aldol.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: May form explosive peroxides on contact with air. If a metal such as iron is present, it may polymerize under the influence of a basic substance such as sodium hydroxide or an acid.
Conditions to avoid	: Light, heat.
Incompatible materials	: Alkaline substances, acids, oxidizing substances.
Hazardous decomposition products	: Carbon monoxide.

11. Toxicological information

Acute toxicity (oral)	: Harmful if swallowed rat LD50=660mg/kg
Acute toxicity (dermal)	: Toxic in contact with skin rat LD50=640mg/kg
Acute toxicity (inhalation)	: No classification (gas) Harmful if inhaled (vapor) rat LC50=13300ppm/4h Classification not possible (dust, mist)
Skin corrosion/irritation	: No classification Because it is reported that slight irritation was observed after the application of 500 mg this substance in a skin irritation test using rabbits, it was classified as "No classification".
Serious eye damage/irritation	: Causes serious eye irritation Because it is reported that in an eye irritation test using rabbits, severe irritation was observed after 40 mg this substance was applied, it was classified into category 2A.
Respiratory sensitization	: Classification not possible
Skin sensitization	: May cause an allergic skin reaction It is reported that in two patch tests in humans, sensitization was observed. Moreover, contact allergy was reported in the textile industry, and it is written that this substance is a contact allergen. From the above, it was classified into category 1.



Germ cell mutagenicity	: Suspected of causing genetic defects As for in vivo, it is reported that a micronucleus test in mouse spermatids after intraperitoneal administration was negative, a micronucleus test in rat bone marrow cells, peripheral blood erythrocytes, mouse bone marrow cells after intraperitoneal administration was positive, a chromosomal aberration test in rat embryo cells after intra-amniotic administration on day 13 of gestation and a chromosomal aberration test in rats were positive, and a sister chromatid exchange test in mouse bone marrow cells and Chinese hamster bone marrow cells after intraperitoneal administration was positive. As for in vitro, a bacterial reverse mutation test was negative, and a mouse lymphoma test, an HPRT gene mutation test, a micronucleus test, a chromosomal aberration test, and a sister chromatid exchange test in cultured mammalian cells were all positive. From the above, due to positive in vivo somatic cell mutagenicity test and in vivo somatic cell genotoxicity test, a negative in vivo germ cell mutagenicity test, no in vivo germ cell genotoxicity test data, and a positive in vitro mutagenicity test result, the substance was classified into category 2. The substance is recognized to have mutagenicity by the Ministry of Health, Labor and Welfare.
Carcinogenicity	: May cause cancer This substance is a metabolite of ethanol, and by claiming that acetaldehyde associated with the consumption of alcoholic beverages has sufficient evidence of forming esophageal cancer and so on in humans, IARC classified it in group 1. As for carcinogenicity classifications for this substance excluding effects of drinking alcoholic beverage, it was classified in A3 by ACGIH, B2 by EPA, and R by NTP. As for experimental animals, in a carcinogenicity test using rats in an inhalation route, tumors of the nasal mucosa increased at doses of 1,500 ppm or higher, and in an inhalation exposure test in hamsters laryngeal carcinomas were found, therefore, IARC classified this substance in "group 2B" in the carcinogenicity classification in 1999 because there is solid evidence of carcinogenicity in experimental animals but inadequate evidence in humans. From the above, carcinogenicity is certain in experimental animals, and there is no evidence of carcinogenicity for exposure except the consumption of alcoholic beverages in humans. However, it is thought that carcinogenicity in the nasal mucosa and larynx in an inhalation route in experimental animals may also occur in humans in occupational exposure in an inhalation route. Therefore, the substance was classified into category 1B in this hazard class.



Reproductive toxicity	: May damage fertility or the unborn child As for experimental animals, it is written that in a teratogenicity test in pregnant mice in intravenous injection of this substance on day 7 to 9 of gestation, a dose-dependent increase in resorptions, decreased fetal weight, and an increased incidence of malformations such as exencephaly and neural tube closure anomalies were observed in fetuses, and that in a test in pregnant rats in intraperitoneal injection on day 10 to 12 of gestation, increased resorptions, decreased fetal weight, decreased crown-rump length and tail length, and increased malformations were found. It is written that also in a test in pregnant rats in oral administration, skeletal malformations were also found in fetuses, and it is written that fetal malformations were found in rats and mice treated with this substance in vivo and in vitro. From the above, it is thought that exposure to this substance in pregnant animals during an organogenetic period surely induces malformations. Besides, in a recent report, in an experiment in which ethanol and aldehyde were added in an in vitro culture test system using marketed cell line of "trophoblast" which is said to be differentiated into the placenta, cellular proliferation was depressed in all groups added, and groups with aldehyde showed apoptosis as well. The authors hypothesized that exposure to either ethanol or acetaldehyde in pregnant women could become pathogenesis of fetal alcohol spectrum disorder by reducing placental growth. As above, malformation induction by this substance is apparent in experimental animals. Although teratogenicity in humans is unknown, because this substance is suspected as a causative substance of fetal alcohol spectrum disorder in humans, a research study is being conducted as above. Therefore, the substance was classified into category 1B in this hazard class.
STOT-single exposure	: Causes damage to organs (central nervous system, respiratory organs) May cause drowsiness or dizziness In human poisoning cases, headache, cough, bronchitis, pulmonary edema, coma, central nervous system depression, decreased heart rate and respiratory rate, motor paralysis, and death in inhalation, and cough, pulmonary edema, lung necrosis, and central nervous system depression in dermal exposure were observed, and convulsions and death were found at the high doses. As for experimental animals, the following was reported in rats: central nervous system depression, decreased respiratory rate, increased heart rate, increased blood pressure, pulmonary edema, and proteinuria in oral (the dose corresponding to category 2) and dermal (the dose corresponding to category 1); and narcotic effects, clouding of consciousness, bronchitis, and pulmonary edema in inhalation (the dose corresponding to category 1). From the above, because this substance has mainly respiratory tract irritation, effects on the central nervous system, narcotic effects, effects on respiratory organs, it was classified into category 1 (central nervous system, respiratory organs), category 3 (narcosis).



- STOT-repeated exposure : Causes damage to organs (respiratory organs) through prolonged or repeated exposure
As for humans, "erythema, cough, pulmonary edema, narcotic effects", "headache, narcotic effects, paralysis, decreased respiratory rate, irritation to respiratory organs, bronchitis, pulmonary edema" were listed, but all of these describe effects of single exposure. As for experimental animals, in a 4-week inhalation toxicity test using rats, degeneration of the nasal mucosa was observed at 400 ppm within a range of category 1, and in a 5-week inhalation toxicity test using rats, hyperplasia of the olfactory epithelium, inflammation of the nasal mucosa, increased residual volume and functional residual capacity, damage of the distal airways in lung function tests were found at 243 ppm within a range of category 1 Besides these, in a 52-week inhalation toxicity test using rats, degeneration of the olfactory epithelium and replacement of olfactory epithelium by respiratory epithelium were observed at 750 ppm or higher, a range above category 2, and in a 90-day inhalation toxicity test using hamsters, stratified respiratory epithelium was found at 1340 ppm within a range of category 2. From the above, the substance was classified into category 1 (respiratory organs).
- Aspiration hazard : Classification not possible

12. Ecological information

Ecotoxicity

- Aquatic acute : Harmful to aquatic life
Pseudokirchneriella subcapitata ErC50=26 mg/L/72h
- Aquatic chronic : No classification
Pseudokirchneriella subcapitata NOEC=1.9 mg/L/72h

Persistence and degradability

Readily biodegradable
BOD : 80%

Bioaccumulative potential

Low bioconcentration
log Pow : -0.34

Mobility in soil

High mobility
Koc : 1

Hazardous to the ozone layer

- Ozone : Classification not possible

13. Disposal considerations

- Ecological waste information : Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.
- Contaminated container and packaging : In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.



14. Transport information

International Regulations

Transport by sea(IMDG)

UN-No. (IMDG) : 1089
Proper Shipping Name (IMDG) : ACETALDEHYDE
Packing group (IMDG) : I
Transport hazard class(es) : 3

(IMDG)

Air transport(IATA)

UN-No. (IATA) : 1089
Proper Shipping Name (IATA) : Acetaldehyde
Packing group (IATA) : I
Transport hazard class(es) : 3

(IATA)

Marine pollutant : Not applicable

MFAG-No : 129

15. Regulatory information

Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

16. Other information

Data sources : NITE Chemical Risk Information Platform (NITE-CHRIP), National Institute of Technology and Evaluation.
Encyclopaedia Chimica, Kyoritsu Shuppan Co, Ltd. (1963) .
Handbook of Dangerous Substances Springer-Verlag Tokyo (1991) .

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet(SDS) is prepared based on JIS Z7253.

