



Safety Data Sheet



1. Identification of the Substance/Mixture and the Supplier

Supplier : The National Institute of Advanced Industrial Science and Technology

Address : 1-3-1, Kasumigaseki, Chiyoda, Tokyo, Japan

Department : Reference Material Office, Center for Quality Management of Metrology, The National Metrology Institute of Japan

Person in Charge : Certified Reference Material Staff

Phone Number : 029-861-4059 Fax Number : 029-861-4009

Emergency Contact : Same as above

Prepared on : December 28, 2010
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ID Number : 4054001

Identity of Substance/Mixture : Certified reference material NMIJ CRM 4054-a Acetaldehyde

Recommended Use of the Chemical and Restriction on Use : This CRM is intended for use in calibration of analytical instruments, quality control of analytical instruments, and validation of analytical techniques and instruments.
Do not use this reference material for other purposes than testing/research.

2. Hazards Identification

GHS Classification :

Flammable liquid	: Hazard Category 1
Skin corrosion/irritation	: Hazard Category 2
Serious Eye Damage/ Eye Irritation	: Hazard Category 2A
Acute Toxicity(Oral)	: Hazard Category 4
Carcinogenicity	: Hazard Category 2
Germ cell mutagenicity	: Hazard Category 2
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	: Hazard Category 1 (Respiratory organ, nervous system) Hazard Category 3 (anesthetic action)
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	: Hazard Category 1 (Respiratory organ, nervous system)
Water environment toxicity (Acute)	: Hazard Category 2

GHS Label Element :





Signal Word : Danger

Hazards Statement : Extremely flammable liquid and vapor
 Skin irritancy
 Strong eye irritancy
 Harmful if swallowed.
 Suspected of causing cancer.
 Suspected of causing genetic defects.
 Causes damage to organs (respiratory organ and nerve system).
 May cause drowsiness or dizziness.
 Causes damage to organs (respiratory organ and nerve system) through prolonged or repeated exposure.
 Harmful to aquatic life

Precautionary Statement : [Precaution]
 Do not eat, drink or smoke when using this product.
 Do not handle until all safety precautions have been read and understood.
 Use protective gloves, protective glasses and face mask.
 Use only outdoors or in a well-ventilated area.
 Keep away from ignition sources such as heat/sparks/open flames/hot surfaces.
 Take precautions against electrostatic discharge.
 Wash hands thoroughly after handling.
 Do not breathe dust, fume, mist, vapors, spray, etc.
 Avoid release to the environment.
 Seal tightly after use.

[First-aid Action]
 If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.
 If swallowed : Rinse his/her mouth with plenty of water. Get medical advice/attention in case of abnormalities.
 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists: Get medical advice/attention.
 Immediately get medical advice/attention if you feel unwell.
 If on skin: Remove/Take off all contaminated clothing and adhered materials. Rinse skin with running water and soap.
 Wash the contaminated clothing before re-used.
 If skin irritation occurs: Get medical advice/attention.
 If exposed or concerned: Get medical advice/attention.

[Storage]
 Store in a closed container in a cool and well-ventilated place.

[Disposal]
 Entrust disposal of this reference material or empty containers to a professional waste disposal company licensed by prefectural governor.

The other hazards than the above do not result in classification or are not classifiable.

3. Composition/Information on Ingredients

Substance/Mixture	: Single substance
Chemical Identity	: Acetaldehyde
Content	: 99.8 %
Chemical Formula	: CH ₃ CHO
Molecular Weight	: 44.05
ID Number in Official Gazette	: Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc., Industrial Safety and Health Act: 2-485
CAS Number	: 75-07-0
Hazardous Ingredient	: Acetaldehyde

4. First-Aid Measures

If swallowed	: Give plenty of water or salt water. Get medical advice/attention. Do not induce vomiting.
If in eyes	: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
If on skin	: Remove/Take off immediately all contaminated clothing. Wash skin with plenty of soap and water/shower. If skin irritation occurs: Get medical advice/attention.
If inhaled	: Remove victim to fresh air and keep at rest and warm in a position comfortable for breathing. Then get medical advice/attention.

5. Fire-Fighting Measures

Extinguishing Media	: Powder, foam (alcohol resistance foam), carbon dioxide, dry sand, water spray (rod-like water injection prohibited).
Fire-Specific Hazards	: Wear respiratory protective equipment as toxic gases (carbon monoxide, etc.) are generated due to combustion or high temperature.
Specific Fire-Fighting Method	: Eliminate ignition sources at the origin of a fire and put out fire by using extinguishing media. Remove movable containers promptly to a safe place. In the case of immovable containers, cool their surroundings with sprayed water.
Protection of Fire-Fighters	: Carry out fire-fighting from the windward in order to avoid breathing hazardous gas. Use personal protective equipment such as fireproof clothing, heat-resistant clothing, protective clothing, compressed air open-circuit self-contained breathing apparatus, compressed oxygen closed-circuit self-contained breathing apparatus, rubber gloves and rubber boots.

6. Accidental Release Measures

Personal Precaution	: Remove ignition source in the vicinity immediately. Prepare
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Personal Protective

fire-fighting equipment for the possibility of fires.

Ventilate the affected areas thoroughly, if it is in an indoor environment, until the clean-up operation is completed.

Equipment and
Emergency
Procedures

: Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.

Environmental
Precautions

: Take precautions to prevent spillage from draining into rivers etc. to adversely impact the environment. Make it sure to appropriately treat contaminated wastewater in order to prevent untreated wastewater from being released into the surrounding environment.

Recovery and
Neutralization

: Strict ban on fire. Adsorb spillage with dry sand or non-active adsorbent, etc. and collect in empty containers. Rinse away the remains with plenty of water. Use water spray to absorb the vapor of this CRM.

Prevention of
Secondary Disaster

: Mark the restricted area with rope etc. to keep out unauthorized people. Carry out the clean-up operation from the windward and make people on the leeward side evacuate.

7. Handling and Storage Precautions

Handling

Engineering

: Strict ban on fire.

Precautions

Keep away from hot surfaces and sparks. Do not allow contact with strong oxidizer.

Local and General
Ventilation

: Use local ventilation system in indoor handling areas.

Precautions for Safe
Handling

: Avoid rough handling such as turning over, dropping, giving a shock to or dragging containers.

Prevent spill, overflow and scattering, and avoid vapor generation.

Keep container tightly closed after using this reference material.

Wash hands, face etc. thoroughly and gargle after handling this reference material.

Restrict drinking, eating and smoking to a designated area.

Do not bring gloves and other contaminated personal protective equipment into staff room.

Make a place handling this reference material a restricted area to keep out unauthorized people.

Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.

Use local ventilation system in indoor handling areas.

Electrical equipment to be used in the storage location should be explosion-proof structure, and grounded, if necessary.

Storage



- Appropriate Storage Conditions : Store in a closed container in a cool and dark place at temperatures around $-20\text{ }^{\circ}\text{C}$.
Use explosion-proof electrical equipment and ground all equipment in storage area.
Store away from strong oxidizer and ignition source.
- Safe Container Packaging Material : Glass

※Please refer CRM certificate about storage conditions as reference material.

8. Exposure Controls/Personal Protection

Threshold Limit Value Work environment evaluation criteria
Not specified

Permissible Concentration

- OSHA PEL : Not specified
- ACGIH TLV : 25 ppm(upper limit) 45 mg/m³(upper limit)
- Value recommended by Japan Society for Occupational Health : 50 ppm、90 mg/m³

Engineering Controls

- Keep container tightly closed or use local ventilation system in indoor handling area.
- Use explosion-proof equipment. Take precautionary measures against static discharge for facilities.
- Install safety shower and facilities to rinse eyes and to wash hands in the vicinity of a place handling this reference material and label them clearly.

Personal Protective Equipment (PPE)

- Respiratory System : Protective gas mask for organic vapors, Self-contained compressed air breathing apparatus.
- Hands : Protective gloves
- Eyes : Protective glasses
- Skin and Body : Protective clothing, protection boots

9. Physical and Chemical Properties

- Appearance, etc. : Clear liquid
- Color : Colorless
- Odor : Irritating odor
- pH : No data
- Melting Point : $-123\text{ }^{\circ}\text{C}$
- Boiling Point : $20.2\text{ }^{\circ}\text{C}$
- Flash Point : $-38\text{ }^{\circ}\text{C}$
- Auto-Ignition Temperature : $185\text{ }^{\circ}\text{C}$
- Explosive Range : 4~60 %(v/v)
- Vapor Pressure : 101 kPa($20\text{ }^{\circ}\text{C}$)
- Relative Vapor Density (Air=1) : 1.5(air = 1)
- Specific Gravity or Bulk Specific Gravity : 0.78



- Solubility : Soluble in water, ethanol and ether.
- Partition Coefficient : n-octanol/water : 0.63
- log Po/w

10. Stability and Reactivity

◇Stability

- Un stable in the air and self polymerizable.
- May generate explosive peroxide through prolonged exposure to air.

◇Reactivity

- May get polymerized by acid or alkali hydroxides, which may cause fire or explosion.
- This reference material is a strong reducer, which violently reacts with oxidizer, strong acid, halogen and amine to pose a danger such as fire or explosion.

◇Conditions to Avoid

- Sunlight, Heat, open flame, high temperature material, spark, static electrical charge, and other fire sources.

◇Hazardous Decomposition Products

- Carbon monoxide (CO)

11. Toxicological Information

Acute Toxicity	Oral Rat LD50 : 661 mg/kg (RTECS) Inhalation(vapor) Rat LC50 : 24 mg/L/4H (EHC 167(1995))
Skin Corrosion/ Irritation	Skin irritation: Rabbit 500 mg Mild Considered to cause "moderate irritation" based on the description of the skin irritation test using rabbits (ACGIH 7 th (2001))
Serious Eye Damage/ Eye Irritation	Eye irritation: Rabbit 40 mg Severe (RTECS) In the eye irritation test using rabbits, "serious eye irritation" was observed, and it was not reported as irreversible effect (ACGIH 7 th (2001)).
Germ Cell Mutagenicity	Chromosome abnormality test: D20 value: 0.025 mg/ml (Notice issued by Ministry of Labor, Health and Welfare (Notification No.0926010)) Mutagenicity test using microorganism: Negative "CERI·NITE Hazard Assessment Report No.61 (2004)": No germ cell in vivo trans-generation mutagenicity test conducted, Negative in the germ cell in vivo mutagenicity test (Micronucleus test using mouse spermatocytes), Positive in the somatic cell in vivo mutagenicity test (Micronucleus test & Chromosome abnormality test), No germ cell in vivo genotoxicity test conducted.
Carcinogenicity	IRIS (2005): B2 NTP: R (Human carcinogen) IARC: Group 2B (Possibly carcinogenic to humans) Japan Society for Occupational Health: Group 2B; Probably carcinogenic to humans (The agents with relatively insufficient evidence)
Reproductive Toxicity	"CERI·NITE Hazard Assessment Report No.61 (2004)": In the



experiments in which acetaldehyde was administered to female CF rats once on the 10th, 11th or 12th day of pregnancy or in which acetaldehyde of 0, 50, 75 or 100 mg/kg/day was administered to abdominal cavity on the 10th day through 12th day of pregnancy, death of embryos, deformity (edema, syndactyl, capitellum, micrognathia, exencephalia and hydrocephalus), growth retardation, cataract and decrease of body/placenta weight were observed when the doses are 50 mg/kg or more. (No effect on parent rats was observed in any cases.) (Administration into abdominal cavity)

In the experiments in which acetaldehyde of 200 mg/kg/day (3% aqueous solution) was orally administered to female SD rats on the 6th day through 18th day of pregnancy, effect on fetal skeleton was observed. (No specific description is given. No effect on parent rats was observed.)

Specific Target Organ
Toxicity/Systemic
Toxicity (Single
Exposure)

For humans, "Coughing and burning pain in nose, throat or eyes were observed," and "Accidental exposure to acetaldehyde caused headache, coma, eye/skin/respiratory/throat irritation, bronchitis, pulmonary edema, motor paralysis and death." ("CERI-NITE Hazard Assessment Report No.61 (2004)")

"Systemic symptoms including anesthetic action and consciousness clouding, bronchitis, pulmonary edema, etc. were caused." (Ministry of Environment "Risk Assessment vol. 1 (2002)")

Specific Target Organ
Toxicity/Systemic
Toxicity (Repeated
Exposure)

For humans, "erythema, coughing, pulmonary edema and anesthetic action" are reported in ACGIH 7th (2001), and "headache, anesthetic action, paralysis, decrease in breathing rate, respiratory irritation and pulmonary edema" are reported in CaPSAR (2000).

12. Ecological Information

Degradability, bioaccumulation properties

- Degree of decomposition: 80 % (by BOD)

Bioaccumulative Potential

- Estimated to have low bioaccumulation property (log Kow=-0.34 (PHYSPROP Database, 2005))

Ecotoxicity

- Fish (Bluegill) LC50(96 hours) : 2.1 mg/L (CERI-NITE Hazard Assessment Report, 2004)

13. Disposal Considerations

- Dispose of this reference material in accordance with applicable legislation and local government ordinance. When the above-mentioned treatments are not possible, entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor.
- Dispose of containers after thoroughly removing their contents.

14. Transport Information

UN Number	: 1089
UN Classification	: Class 3 (Flammable liquid)
Shipping Name	: Acetaldehyde
Packing Group	: PG I
Marine Pollutant	: Not specified
Precautions	: Transport this reference material carefully while keeping it away from direct sunlight and fire and preventing accidental release due to falling, overturning, etc.

15. Applicable Legislation

◇ Fire Service Act

- • Type 4 Hazardous Substance, special inflammable substances (Water-soluble),

Danger Rating 1

◇ Industrial Safety and Health Act

- Article 57-2 (Enforcement Order 18-2): Hazardous materials whose name, etc. must be notified No.14
- Enforcement Order Appendix 1-4: Flammable materials
- Existing chemical substances whose mutagenicity is recognized (Notice issued by Ministry of Labor, Health and Welfare (Notification No. 0926010)

◇ Ship Safety Law (Dangerous Material Rule)

- Flammable Liquids

◇ Civil Aeronautics Act

- Flammable Liquid

◇ Pollutant Release and Transfer Register (PRTR) Law

- Class 1 Designated chemical substances No.12

16. Other Information

References

- Complete Substances Data subject to MSDS (Revised 2nd Edition), The Chemical Daily (2007)
- International Chemical Safety Cards (ICSC) Japanese version, The Chemical Daily (1992)
- National Institute of Technology and Evaluation, <http://www.safe.nite.go.jp/ghs/list.html>
- Japan Industrial Safety and Health Association, Japan Advanced Information Center of Safety and Health <http://www.jaish.gr.jp/>

Others

The information in this Safety Data Sheet is not intended to be exhaustive and is based on currently-available information and data. The precautions given in this data sheet are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety precautions appropriate to each specific application and context of use. This Safety Data Sheet (SDS) is intended to provide



information and not intended to guarantee anything in handling the reference material.
This Safety Data Sheet (SDS) is prepared based on JIS Z7253:2012, and presents identical information to Material Safety Data Sheet (MSDS) prepared based on JIS Z7250:2010.

Sample