

## Acetic acid

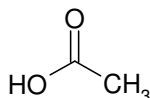
### Safety Data Sheet

according to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

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

##### 1.1. Product identifier

PRODUCT NAME: : Acetic acid, Glacial  
CAS RN : 64-19-7  
EC# :200-580-7  
SYNONYMS : Ethanoic acid, Methanecarboxylic acid  
SYSTEMATIC NAME :Ethanoic acid  
MOLECULAR FORMULA : CH<sub>3</sub>COOH  
STRUCTURAL FORMULA



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

###### 1.2.1. Relevant identified uses

Used in the manufacture of Chemicals such as Vinyl Acetate Monomer, Acetic Anhydride, Acetate esters and Chloroacetic acid. Used as a solvent in the manufacture of terephthalic acid and other applications. Used in the Textile, Pharmaceutical, Photographic, Dyestuff, Pesticide and Rubber industry. Used to make specialty chemicals such as Sorbic acid.

**Uses advised against:** None

##### 1.3. Details of the supplier of the safety data sheet

Jubilant Life Sciences India

**FACTORY & REGISTERED OFFICE:** Jubilant Life Sciences Ltd., Bhartiagram, Gajraula, District: Amroha, Uttar Pradesh-244223, India

**HEAD OFFICE:** Jubilant Life Sciences Ltd., Plot 1-A, Sector 16-A, Institutional Area, Noida, Uttar Pradesh, 201301 - India

**T:FACTORY & REGISTERED OFFICE :** T +91-5924-252353 to 252360 Contact Department-Safety: Ext. 7424**HEAD OFFICE:** T +91-120-4361000  
[support@jubl.com](mailto:support@jubl.com)

##### 1.4. Emergency telephone number

Emergency number : +91-9997022412; +91-9359674864

#### SECTION 2: Hazard(s) identification

##### 2.1. Classification of the substance or mixture

###### GHS-US classification

Skin corrosion: Category 1B  
Metal corrosive: Category 1  
Flammable Liquid: Category 3  
Serious eye damage: Category 1  
Acute Toxicity Inhalation: Category 4  
Harmful to aquatic Life: Category 3

##### 2.2. Label Elements

**Hazard Pictogram:** GHS 05 and GHS 02

**Signal Word:** Danger



###### **HAZARD AND PRECAUTIONARY STATEMENTS:**

###### **HAZARDS STATEMENTS**

- H314: Causes severe skin burns and eye damage.
- H290: May be corrosive to metals.
- H226: Flammable liquid and vapour.
- H318: Causes serious eye damage.
- H 332: Harmful if inhaled.
- H412: Harmful to aquatic life with long lasting effects.



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### PRECAUTIONARY STATEMENTS

- P 273: Avoid to the release to the environment.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P260: Do not breathe dust/fume/gas/mist/vapours/spray.
- P264: Wash hands thoroughly after handling.
- P261: Avoid breathing fume/mist/vapors/spray.
- P271: Use only outdoors or in a well-ventilated area.
- P234: Keep only in original container.
- P210: Keep away from heat/ sparks/open flames/hot surfaces. No smoking.
- P233: Keep container tightly closed.
- P240: Ground/ bond container and receiving equipment.
- P241: Use explosion proof electrical/ventilating/lighting equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P310: Immediately call a POISON CENTER or doctor/physician.
- P301+P330+331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P303+P361+P353: IF ON SKIN(OR HAIR): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P363: Wash contaminated clothing before reuse.
- P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P321: Specific treatment reference to supplemental first aid instruction, if immediate specific measures are required.
- P312: Call a POISON CENTER or doctor/physician.
- P390: Absorb spillage to prevent material damage.
- P370+P378: In case of fire use Manufacture /supplier to specific appropriate media for extinction.
- P405: Store locked up.
- P406: Store in a corrosive resistant/container with a resistant inner liner.
- P403+P235: Store in a well-ventilated place. Keep cool.
- P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

### SECTION 3: Composition/information on ingredients

Chemical	CAS #	Purity	GHS-US classification
Acetic acid	64-19-7	~100%	Skin corrosion: Category 1B Metal corrosive: Category 1 Flammable Liquid: Category 3 Serious eye damage: Category 1 Acute Toxicity Inhalation: Category 4 Harmful to aquatic Life: Category 3

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

##### Key symptoms

##### Acute effects

- **Eyes:** Redness, pain, burns, loss of vision.
- **Skin:** Pain, redness, burns.
- **Inhalation:** Sore throat, cough, burning sensation, shortness of breath, labored breathing, Symptoms may be delayed and may be aggravated by physical exertion.
- **Ingestion:** Abdominal pain, burning sensation, diarrhea, shock or collapse, sore throat or vomiting.

##### Chronic effects

- Workers exposed for 7-12 yr at concentrations of 60 ppm, plus 1 hr daily at 100-200 ppm had conjunctivitis, bronchitis, pharyngitis, and erosion of exposed teeth.

##### First Aid

- **Eyes:** If in eyes rinse cautiously with water for at least 15 minutes. Remove contact lenses if easy to do so. Continue rinsing. Seek medical attention.
- **Skin:** Immediately take off all contaminated clothing. Wash thoroughly with water for at least 15 minutes. Wash contaminated clothes before reuse. Seek immediate medical attention.
- **Inhalation:** Remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if you feel unwell.
- **Ingestion:** If swallowed call a poison center if you feel unwell. Rinse mouth. Do NOT induce vomiting by use of emetics. Seek medical attention.



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#### SECTION 5 : FIRE-FIGHTING MEASURES

##### Extinguishing media

- *Appropriate extinguishing media:* Alcohol resistant foam, Dry chemical powder, Carbon dioxide. Water spray or fog-large fires, Water in direct jets may be ineffective to extinguish. Water in flooding quantities may be used

##### Special Protective Equipment and Precautions for Fire Fighter

- Fire fighters must wear Self Contained Breathing Apparatus (SCBA) and full protective clothing. The chemical is corrosive on contact.
- Report any run-off of firewaters contaminated with this chemical as per local and federal procedures applicable.

##### Unusual fire and explosion hazard

- Toxic vapors may be released on thermal decomposition including carbon monoxide and carbon dioxide.
- High vapor concentration may result in an explosion hazard.
- Vapors are heavier than air and may accumulate in low-lying areas like basements and drains.

#### SECTION 6 : ACCIDENTAL RELEASE MEASURES

##### Minor Spills

- Clean up all spills immediately following relevant Standard Operating Procedures.
- Avoid breathing vapors and contact with skin and eyes.
- Shut off leak source if possible.
- Shut off all possible sources of ignition.
- Wear protective clothing, boots, impervious gloves and safety glasses.
- Wipe up.
- Decontaminate all equipment.

##### Major Spill

- Alert Emergency Responders and tell them location and nature of hazard.
- Shut off all possible sources of ignition and increase ventilation.
- Wear protective clothing, full boots, impervious gloves, safety glasses and Self Contained Breathing Apparatus (SCBA), as may be deemed appropriate.
- Clear area of personnel and move upwind.
- Stop leaks if possible.
- Prevent, by any means available, spillage from entering drains or water and watercourses.
- Collect recoverable product into labeled containers for recycling, recovery or disposal.
- Contain spill with sand, earth or vermiculite.
- Spread area with lime or absorbent material, and leave for at least 1 hour before washing.
- Clean up all tools and equipment.
- Inform authorities in event of contamination of any public sewers, drains or water bodies.

#### SECTION 7: HANDLING AND STORAGE

##### Precautions for safe handling

- Do not breathe vapor or mist.
- Wear protective gloves/clothing and eye/face protection.
- Wash thoroughly after handling.
- Ground and secure containers when dispensing or pouring product.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Launder contaminated clothing before re-use.
- If on skin or hair, IMMEDIATELY remove all contaminated clothing and rinse/shower with plenty of water.
- Use in a well ventilated place/Use protective clothing commensurate with exposure levels.

##### Storage

- Store in a cool, well ventilated place.
- Store away from incompatible materials.
- Keep container tightly closed.
- Keep securely closed when not in use.

#### SECTION 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

##### Control parameters

- **Exposure Limits Values**  
Exposure Limits: 1ppm=2.494 mg/m<sup>3</sup>



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TEEL

Chemical Name	Regulatory Bodies	TLV	TLV	STEL	STEL	STEL
		8 Hr	8Hr	15 min.	15 min.	5 min
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	mg/m <sup>3</sup>
Acetic Acid	US ACGIH TLV 2001	10		15		
	US OSHA (PELs)	10	25			
	NIOSH REL	10	25	15	37	
	MAK (DE)		25			50
	OES (UK)		25			
	India (PEL)	10	25			
	EU OEL (Europe, 4/2004).	10	25			

Immediately Dangerous Life Health (IDLH): 50ppm  
**Values (US DOE) Rev. 20, 2004**

Values	Conc.	Health Effects
TEEL 0:	5 ppm	No average appreciable risk of health effects
TEEL 1:	5 ppm	Mild transient health effects or clearly defined objectionable odor
TEEL 2:	35 ppm	Irreversible or other serious health effects or symptoms that could impair their abilities to take protective action
TEEL 3:	250 ppm	The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing or developing life-threatening health effects.

### Exposure Controls

- **Appropriate Engineering Controls:**
- Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits. Local ventilation is usually preferred. Ensure that eyewash stations and safety showers are close to the workstation location

### Personal Protection:

Hands: Compatible gloves. (Butyl rubber gloves)

Eyes: Safety goggles/ Chemical Safety glasses and Face shield.

Clothing: Boots and clothing to prevent contact.

Respirator: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

- 1-10 times OEL: Use use air-purifying respirator with full facepiece and organic vapor cartridge(s) or air-purifying full facepiece respirator with an organic vapor canister or a full facepiece powered air-purifying respirator fitted with organic vapor cartridge(s). The air purifying element must have an end of service life indicator, or a documented change out schedule must be established. Otherwise, use supplied air if in doubt.
- For concentrations more than 10 times the occupational exposure level and less than the lower of either 100 times the occupational exposure level or the IDLH: Use Type C full face piece supplied-air respirator operated in positive-pressure or continuous flow mode.
- For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full face piece in positive-pressure mode or Type C positive-pressure full face piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus (SCBA) escape system.
- Escape respirators are designed to be used only in an emergency; and only to escape from a dangerous area to a safe area, typically designed for one-time use for a short period, typically 15 minutes to 1 hour.

### Protective Material

Material	Grade
BUTYL; NEOPRENE; NITRILE+PVC; PE; SARANEX-23; TEFLON; PE/EVAL/PE; PVC	A
NATURAL RUBBER; NITRILE; BUTYL/NEOPRENE NATURAL + NEOPRENE	B
NAT+NEOPR+NITRILE	C

A: Best Selection;

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

### General Industrial Hygiene:

- Use in a flame proof area.
- Wash thoroughly after handling.
- The material is an acid and corrosive to both skin and several metals.

## SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

- **Information on basic physical and chemical properties.**

Sr.No.	Parameter	Typical value
1	Appearance	Colorless liquid
2	Odor	Sour vinegar like odor. (NIOSH)
3	Odor threshold	24.3 ppm ASTM (1978) Odor is often not a good indicator for this chemical.

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4	pH	Aq soln 1.0 molar= 2.4; molar= 2.9; 0.01 molar= 3.4
5	pKa (@25°C)	4.76
6	Melting point	16.7°C
7	Boiling point	118°C
8	Flash point	39°C (103°F)
9	Evaporation rate (n-BuAc=1)	0.97
10	Explosive limits	5.4-16%
11	Vapor pressure	1.5 kPa @20°C
12	Relative Vapor density (air=1)	2.1
13	Relative density	1.0492 at 20 deg C
14	Solubility	Miscible in alcohol, acetone, glycerol, ether, carbon tetrachloride, benzene. Insoluble in CS <sub>2</sub>
15	Refractive Index	Not available
16	Log Kow (octanol/water)	-0.17 (ACS 1995)
17	Auto-ignition temperature	485°C
18	Decomposition temperature	Not available
19	Viscosity	1.056 mPa-s @ 25 deg C (CRC Handbook)
20	Surface Tension	Not Available
21	Static charge development	Not Available
22	Molecular Weight	60.1
23	Flammable material	Yes
24	Corrosive material	Yes
25	Explosive Material	No

#### SECTION 10: STABILITY AND REACTIVITY

- **Stability:** This chemical is stable.
- **Conditions to avoid:** Keep away from heat, sparks and flame. Reactive with metals, oxidizing materials and bases (including amines). May react violently with PCl<sub>3</sub> if used to prepare to acid chloride.
- **Incompatible chemicals:** Reactive with metals, oxidizing materials and bases (including amines).
- **Hazardous decomposition:** When heated to decomposition it emits irritating fumes. [Lewis, R.J. Sax's Dangerous Properties of Industrial Materials. 9th ed. Volumes 1-3. New York, NY: Van Nostrand Reinhold, 1996. p. 12]. These may include toxic fumes of carbon monoxide.
- **Hazardous Polymerization:** Not reported.

#### SECTION 11: TOXICOLOGICAL INFORMATION

##### 11.1. Information on toxicological effects

###### a) Acute toxicity

Sr.No	Parameter	Test	Value	Effect	Ref.
1	Acute Toxicity	Oral Rat LD <sub>50</sub>	3310mg/kg	Not reported	RTECS#AF1225000200 602
		Dermal RBT LD <sub>50</sub>	1060 uL/kg	Not reported	RTECS#AF1225000200 602
		IHL Rat LD <sub>50</sub>	11.4 mg/L/4 Hr	Not reported	BASF (IUCLID feb 2000)
		HMN TDLo	1470µg/kg	Gastrointestinal -changes in structure or function of esophagus Gastrointestinal -ulceration or bleeding from small intestine Gastrointestinal -ulceration or bleeding from large intestine	RTECS#AF1225000200 602
		IHL Rat LD50	5620ppm/ 1Hr	Sense Organs and Special Senses (Eye) - conjunctive irritation Sense Organs and Special Senses (Eye) -effect, not otherwise specified Blood - other changes	RTECS#AF1225000200 602

###### b) Skin Corrosion / Irritation

- Acetic acid is corrosive and harmful on skin contact
- Repeated or prolonged contact with skin may cause dermatitis.

Sr.No	Parameter	Test	Value	Effect	Ref.
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1	Skin corrosion /irritation	HMN Skin	50mg/24 hr	Mild	RTECS#AF1225000 200602
2	Skin corrosion /irritation	RBT Skin	525mg	Severe	RTECS#AF1225000 200602

#### c) Serious Eye Damage / Irritation:

Sr.No	Parameter	Test	Value	Effect	Ref.
1.	Eye damage/ irritation	RBT Eye		Highly irritating	Hoechst Ag (IUCLID feb 2000)

#### d) Respiratory or Skin Sensitization:

- Long-term exposure can lead to chronic inflammation of the respiratory tract. (CCOHS 1984)
- Long-term exposure can lead to darkening of the skin and erosion of tooth enamel
- Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the gastrointestinal tract, resulting in digestive disorders including pyrosis and constipation. [IPCS, CEC; International Chemical Safety Card on Acetic acid (October 1997).
- Workers exposed for a number of years to concentration of up to 200 ppm have been found to suffer from palpebral edema with hypertrophy of the lymph nodes, conjunctival hyperaemia, chronic pharyngitis, chronic catarrhal bronchitis and in some cases asthmatic bronchitis and traces of erosion on the vestibular surface of teeth (incisors and canines). Following repeated exposures, workers may complain of digestive disorders with pyrosis and constipation. Skin on palms of hands become dry, cracked and hyperkeratotic. (ILO 1998)

#### e) Germ Cell Mutagenicity:

Sr.No	Parameter	Test	Value	Effect	Ref.
1	Genetic Toxicity	Ames Salmonella	Dose 100-6666 µG/PLATE	Negative	NTP ACETIC ACID 64197

#### f) Carcinogenicity:

- Not listed by NTP, IARC and OSHA.
- Not present on the EU CMR list

According to information presently available acetic acid has been tested and not found to be carcinogenic.

#### g) Reproductive Toxicity:

- According to present information acetic acid is not believed to possess a Reproductive Hazard. (NJ Hazardous Substance Fact Sheet RTK 004 Rev. 1998)

#### h) Aspiration hazard:

- No information available

## SECTION 12: ECOLOGICAL INFORMATION

### a) Toxicity

- Ecotoxicity:Fish
  - Bluegill 96hr LC<sub>50</sub>: 75 mg/l
  - Pimephalus Promelas (Fathead Minnow)
    - LC<sub>50</sub>: (1;24;48;72;96 hr): (>315; 122; 92, 88; 88 mg/l)
- Crustacea
  - Daphnia Magna (pH 7)
    - 24 Hr (EC<sub>0</sub>; EC<sub>50</sub>; EC<sub>100</sub>): 950; 6000; 7145 mg/l)
  - Daphnia Magna 24Hr LC<sub>50</sub>: 47 mg/l
  - Artemia Salina 48 Hr LC<sub>50</sub>: 32 mg/l
- Harmful to aquatic organisms (IPCS 1999)
- High concentrations will produce pH levels toxic to oxidizing bacteria, inhibiting oxygen demand. (Environment Canada 1981, HSDB HSN 40 20050624)
- EC<sub>50</sub> Tobacco fumigation 41 mg/cu m/2 hr, effect: leaf injury (95% confidence interval 4-79) [Verschuieren, K. Handbook of Environmental Data on Organic Chemicals. Volumes 1-2. 4th ed. John Wiley & Sons., York, NY. 2001, p. 102]

### b) Persistence and Degradability

- Photochemical degradation: OH rate constant:  $7.4 \times 10^{-13}$  cm<sup>3</sup>/molecule-sec. Half life is about 22 days in air.
- Biological oxygen demand after 10 days (BOD<sub>10</sub>) at 20 deg C is: 82% biological oxidation in fresh water and 88% biological oxidation in sea water [Verschuieren, K. Handbook of Environmental Data of Organic Chemicals. 3rd ed. New York, NY: Van Nostrand Reinhold Co., 1996, p 106].
- Readily biodegradable.
  - Inoculum: Activated sludge, not adapted.
  - Concentration: 100mg/l
  - Conditions: Aerobic, pH=7
  - Result: 100% degradation after 140 hours.
  - Ref: IUCLID dataset, 2000
- Soil
  - Using a modified OECD protocol, 75% and > 90% degradation of acetic acid was observed after 14 days using garden soil and sediment from the RhineRiver as inocula, respectively. (HSDB, 40, 2005)

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### c) Bioaccumulation

- BCF = 3.162
- Log Kow = -0.17 Low potential to bio accumulate.

Based on the Log Kow and Bio concentration factor value it is expected to have low potential to concentrate in fatty tissue of fish and aquatic organisms.

### d) Mobility

- If released in air based on its vapor pressure of 1.5 kPa @20 degrees acetic acid should exist mostly in the air, where it will photodegrade with a half life of 22 days approximately.
- Henry's Law constant =  $1 \times 10^{-7}$  atm-cu m/mol at 25 deg C, pH 4. indicates a tendency to stay in water rather than volatilize.
- Similarly Koc values ranging from 1 to 228 suggest that acetic acid is expected to have very high to moderate mobility in soil.

### e) Environmental Fate

Based on the environmental modeling, this material has a low potential to get moderate absorbed in the organic matter of soil and is slightly volatile from water bodies and based on the Log Kow and Bio concentration factor value it is expected to have low potential to concentrate in fatty tissue of fish and aquatic organisms.. Since this is an estimated result it is recommended that the material should not be disposed into the environment. The material should never be disposed into the sewage.


## SECTION 13: Disposal considerations

### Waste treatment methods

- EPA Hazardous Waste Code(s): D002
- Dispose of this material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws.
- It is recommended that the waste products should not be disposed in to the sewage.
- Note that disposal regulations may also apply to empty containers and equipment rinsates

## SECTION 14: Transport information

- This substance is considered to be Hazardous for transport by Air/Rail/Road and Sea and thus regulated by IATA/ICAO/ARD/RID/IMO/IMDG.

S.No	Agency	UN Number	Proper Shipping name	Hazard Class	Packing Group
Land Transport	ADR/RIC	UN2789	Acetic acid	Class 8, Sub risk 3	II
Maritime Transport	IMDG	UN2789	Acetic acid	Class 8, Sub risk 3	II
Air Transport	IATA	UN2789	Acetic acid	Class 8, Sub risk 3	II
Hazard Label		Hazard Class 8 (Corrosive), Sub risk Class 3 (Flammable)			

### Environmental hazards

It is expected that this chemical is a marine pollutant and is Harmful to the Aquatic environment

## SECTION 15: REGULATORY INFORMATION

- European Union Information

### Classification as per CLP Regulation 1272/2008:

Acetic acid glacial (CAS#: 64-19-7) is found on most regulatory lists;

**Australia:** AICS: Present



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**Canada:** Present on the DSL

Canada - Saskatchewan Industrial Hazardous Substances  
Canada Domestic Substances List (DSL)  
Canada Ingredient Disclosure List (SOR/88-64)

### European Union

Annex 1: 607-002-00-6  
EC# 200-580-7

### United States

- Listed on TSCA Inventory.
- Clean Air Act:  
CAS# 64-19-7 does not contain any hazardous air pollutants. This material does not contain any Class 1 or 2 Ozone depletery substances.
- Clean Water Act:  
US CWA (Clean Water Act) - List of Hazardous Substances  
US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous
- SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
- CERCLA Chemical: Yes CERCLA RQ lbs: 5000
- EPCRA EHS Chemical: No EPCRA TPQ lbs: Not applicable
- EPCRA 313 Chemical: No
- RTK: Pennsylvania, New York, New Jersey.

Water Hazard Class (Ger.)

- Class 1
- Kenn-Nr. 93
- Source Classification according to VwVwS, Annex 1 or 2

NFPA: Health: 3 Flammability: 2 Reactivity: 0

HMIS: Health: 3 Flammability: 2 Reactivity: 0

## SECTION 16: OTHER INFORMATION

### a) Compilation information of safety data sheet

Date of compilation : March 30, 2012  
Chemical : Acetic acid  
CAS # : 64-19-7  
File Name : 0051Gj Ghs10 Div.1 sds Acetic acid  
Revision Date : January 05, 2016  
Revision : 10  
Revision Due Date : December , 2017  
Supersedes date : October 13, 2015

### b) A key or legend to aberrations and acronyms used in the safety data sheet

- PBT = Persistent Bioaccumulative and Toxic.
- vPvB = Very Persistent and Very Bioaccumulative.
- SCBA = Self Contained Breathing Apparatus.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit. OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Programm.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.
  
- SARA = Superfund Amendments and Reauthorization Act.
- NFPA = National Fire Protection Association.
- WHIMS = Workplace Hazardous Materials Information System.
- DSL/NDL = Domestic/Non-Domestic Substances List.
- CSR = Chemical Safety Report.
- BCF = Bio Concentration Factor.
- DNEL = Derived No Effect Level.
- PNEC = Predicted No Effect Concentration.
- TLV = Threshold Limit Value.
- ACGIH = American Conference of Governmental Industrial Hygienists.
- REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals.
- CLP = Classification, Labelling and Packaging.





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LD / LC = Lethal Doses / Lethal Concentration.

- GHS = Globally Harmonised System.
- ADR = Accord européen relative au transport international de marchandises.
- IMDG-Code = International Maritime Code for Dangerous Goods.
- EmS = Emergency measures on Sea.
- ICAO = International Civil Aviation Organization.
- IATA/DGR= International Air Transport Association/Dangerous Goods Regulation.

#### c) Key Literature reference and sources for data

##### Biographical reference and data sources

- CLP REG (regulation) (EC) no. 1272/2008, last modification by regulation (EC) no. 790/2009
- DIR 67/548/EWG, last modification by DIR 2009/2/EC
- REG (EC) no. 1907/2006, last modification by REG (EC) Nr. 453/2009

#### SDS US (GHS HazCom 2012)

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*

(End of Safety Data Sheet)