1. IDENTIFICATION

Product name:	Glutaraldehyde (ca. 50% in Water, ca. 5.6mol/L)
IUPAC name:	pentanedial
Company:	Hubei Xinjing New Material Co., Ltd.
	12th Floor, Block A, Huitong New Changjiang Center, No. 6 Xudong Street,Wuchang District, Wuhan, Hubei, China.
TEL:	027-83466449
FAX:	027-88716711
Email:	postmaster@xinjingchem.com
Emergency telephone number:	027-83496459
Identified uses:	For industry use only

2. HAZARDS IDENTIFICATION

Physical State **Appearance** **Odor**
Liquid **Clear** **Fruity**

Emergency Overview

DANGER! Keep out of reach of children. Corrosive. CAUSES IRREVERSIBLE EYE DAMAGE. Causes skin burns. Harmful if inhaled. May be fatal if swallowed. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. Causes asthmatic signs and symptoms in hyper-

2.1 Classification of the substance or mixture

Aquatic Acute	Category 1
Resp. Sens.	Category 1
Acute Tox.	Category 3
Skin Corr.	Category1B
Skin Sens.	Category 1
Acute Tox.	Category3
Acute Tox.	Category 2
Eye Dam.	Category 1
Specific target organ toxicity -single exposure	Category3
Aquatic Chronic	Category 2
Skin Sens. 1A	Category 1A

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H400	Very toxic to aquatic life;
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H301	Toxic if swallowed
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H331	Acute Toxicity.
H330	Fatal if inhaled
H318	Causes serious eye damage
H335	May cause respiratory irritation
H411	Toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

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.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P272	Contaminated work clothing should not be allowed out of the workplace.
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

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/…
P321	Specific treatment (see ... on this label).
P330	Rinse mouth.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P363	Wash contaminated clothing before reuse.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310	Immediately call a POISON CENTER/doctor/…
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
P302+P352	Continue rinsing.
P333+P313	IF ON SKIN: Wash with plenty of water/...
P362+P364	If skin irritation or rash occurs: Get medical advice/attention.
P320	Take off contaminated clothing and wash it before reuse.
P312	Specific treatment is urgent (see ... on this label).
P342+P311	Call a POISON CENTER/doctor/…if you feel unwell.
P391	If experiencing respiratory symptoms: Call a POISON CENTER/doctor/...
	Collect spillage.

Storage

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.

2.3 Other hazards which do not result in classification

Physical and Chemical Hazards

no data available

Health Hazards

Harmful if swallowed

Environmental hazards

no data available

Other Hazards

No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance/mixture:

Mixture

3.2 Substances

Formula : $C_5H_8O_2$

Molecular weight : 100.12 g/mol

CAS-No. : 111-30- 8

EC-No. : 203-856--5

Component	CAS No.	EC-No.	Concentration	Classification
Glutaraldehyde	111-30-8	203-856-5	50%-60%	Acute Tox. 2 (H330) Acute Tox. 3 (H301) Skin Corr. 1B (H314) Eye Dam. 1 (H318) STOT SE 3 (H335) Resp. Sens. 1 (H334) Skin Sens. 1 (H317) Aquatic Acute 1 (H400) Aquatic Chronic 2 (H411)
Water	7732-18-5	231-791-2	>= 45.0 %	
Methanol	67-56-1	200-659-6	<= 5%	

No components need to be disclosed according to the applicable regulations.

4. FIRST AID MEASURES

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

Following skin contact

Wash off with soap and plenty of water. Consult a physician.

Following eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control

4.2 Most important symptoms/effects, acute and delayed

Contact with liquid causes severe irritation of eyes and irritation of skin. Chemical readily penetrates skin in harmful amounts. Ingestion causes irritation of mouth and stomach. (USCG, 1999)

4.3 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 as 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. /Aldehydes and Related Compounds/

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media

Use dry chemical, carbon dioxide or alcohol-resistant foam.

5.2 Specific hazards arising from the chemical

Literature sources indicate that this chemical is nonflammable.

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided

6.3 Methods and materials for containment and cleaning up

Accidental release measures. Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe 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: Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for

7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. 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.
Air and light sensitive. Handle and store under inert gas.Storage class (TRGS 510): Non Combustible Liquids, Toxic

8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

Component	List	Type	Value
Glutaraldehyde	ACGIH	Ceiling	0.05 ppm SEN
	ACGIH	TWA	200ppm SKIN BEI

Methanol	ACGIH	STEL	250 ppm SKIN, BEI
	PH OEL	TWA_PH	260 mg/m³ 200 ppm

Biological limit values

no data available

8.2 Appropriate engineering controls

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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

Eye/face protection

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

Skin protection

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

Thermal hazards

no data available

9. Physical and chemical properties and safety characteristics

Physical state	Liquid	
Colour	Clear, colorless liquid.	
Odour	< 1 ppb Literature	
Melting point/freezing point	-33°C	
Boiling point or initial boiling point and boiling range	101.5 - 102 °C @ 98.71 - 101.325 kPa	
Density and/or relative density	1.13g/cm³. Temperature:20 °C.	
Vapour pressure	13 - 3 000 Pa @ 20 - 26.3 °C	
Particle characteristics		
Log Kow (Log Pow)	-0.36 @ 23 °C and pH 7	
Water solubility	solubility	
Flash point	100°C	
Autoflammability / self-ignition	395 °C @ 100.2 - 100.6 kPa	
Decomposition Temperature	no data available	
Viscosity	kinematic viscosity (in mm²/s)	12.75
Lower and upper explosion limit/flammability limit	no data available	
pH	3-5	

10. Stability and reactivity

10 Reactivity

no data available

10 Chemical stability

Stable under recommended storage conditions.

10 Possibility of hazardous reactions

Nonflammable GLUTARALDEHYDE may discolor on exposure to air. It polymerizes on heating. This chemical is incompatible with strong oxidizing agents. It polymerizes in the presence of water.

10 Conditions to avoid

Active ingredient decomposes at elevated temperatures.

11 Incompatible materials

Avoid contact with: Amines. Ammonia. Strong acids. Strong bases.Strong oxidizers.
Avoid contact with metals such as: Aluminum. Carbon steel. Copper. Iron. Mild steel.

11 Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO_2).

11. Toxicological information

Acute toxicity

Oral: LD50 Adverse effect observed LD50 77 mg/kg bw

Inhalation: Adverse effect observed LC50 280 mg/m³

Dermal: LD50 No adverse effect observed Discriminating dose 2000 mg/kg bw

Skin corrosion/irritation	skn-rbt 2 mg/24H SEV skn-hmn 6 mg/3D-I SEV
Serious eye damage/irritation	eye-rbt 250 ug/24H SEV
Respiratory or skin sensitization	no data available
Germ cell mutagenicity	dnd-hmn-leu 5 umol/L mmo-esc 62500 ng/plate (-S9) mmo-sat 150 ug/plate (-S9) mmo-sat 500 nmol/L (+S9)
Carcinogenicity	orl-rat TDLo: 2912 mg/kg/104W-C
Reproductive toxicity	Oral route - systemic effects:Adverse effect observed NOAEL 15 mg/kg bw/day (subchronic, rat) Dermal route - systemic effects:No adverse effect observed NOAEL 150 mg/kg bw/day (subchronic, rat) Inhalation route - systemic effects:Adverse effect observed NOAEC 500 µg/m³ (chronic, mouse) Inhalation route - local effects:Adverse effect observed NOAEC 250 µg/m³ (chronic, mouse)
STOT-single exposure	no data available
STOT-repeated exposure	no data available
Aspiration hazard	no data available
Symptoms/effects,both acute and delayed	Damage to the liver may occur. Inhalation or ingestion may cause intense excitement, loss of consciousness, respiratory paralysis, burning,

12. Ecological information

12 Toxicity

Toxicity to fish:
LC50; Species: Lepomis macrochirus (Bluegill sunfish); Concentration: 22.6 ppm for 96 hr /Conditions of bioassay not specified in source examined/ /50% glutaraldehyde
Toxicity to daphnia and other aquatic invertebrates:
EC50; Species: Daphnia magna (Water Flea) age <24 hr; Conditions: freshwater, static; Concentration: 14600 ug/L for 48 hr (11000-18000 ug/L);
Effect: intoxication, immobilization /50% purity
Toxicity to algae:
EC50; Species: Pseudokirchneriella subcapitata (Green Algae); Conditions: freshwater, static; Concentration: 310 ug/L for 96 hr (90-1040 ug/L);
Effect: population, abundance /50.7% purity

12 Persistence and degradability

AEROBIC: Glutaraldehyde, present at 100 mg/L, reached 59% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(1). Using OECD Guideline 301C (Ready biodegradability: Modified MITI Test (I)), glutaraldehyde reached 74% of its theoretical BOD in 28 days and 80% DOC in 15 days with classified the compound as readily biodegradable(2). Glutaraldehyde was found to be readily biodegradable using OECD Guideline 301D (Closed Bottle Test)(2). In a DOC die-away test, glutaradehyde, present at 25 mg/L, showed 83% degradation in 5 days using a sewage inoculum(3). Glutaraldehyde, present at 8.3 mg/L, degraded 60% in 28 days using sewage inoculum in a CO2 evolution test(3). In a closed bottle test, glutaraldehyde present at 2.0 mg/L, degraded 64% in 28 days using a Polyseed inoculum(3). A higher biodegradability with a short lag time was observed when the glutaraldehyde concentrations in the test systems were low (<2 mg/L) than when the concentrations were high (>8 mg/L). Since bacterial inhibition for glutaraldehyde occurs at about 5 mg/L, the lower biodegradation rates observed in studies where high concentrations of glutaraldehyde were used were likely due to inhibition of the inoculum(3). In a closed bottle test using seawater as inoculum, glutaraldehyde showed 73% degradation in 28 days(3). The major metabolite of glutaraldehyde produced by microbes in an aerobic sediment-river water system was carbon dioxide, with glutaric acid formed as an intermediate in the water phase(3). The calculated pseudo-first-order half-life of glutaraldehyde catabolism in water (based on the loss of the parent compound) under aerobic conditions was 10.6 hours(3). A soil degradation study using a loamy sand soil and initial glutaraldehyde concentration of 10 ppm observed a pseudo-first order biodegradation half-life of 1.7 days due primarily to soil microorganisms(4).

12 Bioaccumulative potential

An estimated BCF of 3 was calculated for glutaraldehyde(SRC), using a log Kow of -0.33(1) and a regression-derived equation(2). According

12 Mobility in soil

Aqueous solutions of [14C] glutaraldehyde in 0.01 M calcium chloride were prepared at concentrations of 0.51, 1.0, 2.5, 5.0, and 10.3 g/L and used to determine the adsorption/desorption characteristics of glutaraldehyde in various soil types according to FIFRA 163-1 guidelines(1). Measured Koc values were 210, 500, 340, 460, and 120 in sandy loam, silty clay loam, silt loam, loamy sand, and sediment, respectively(1). Batch adsorption studies determined Koc values of 22.2, 18.9 and 5.1 in New York loam, Nebraska silt loam and Highview clay loam soils respectively(3). According to a classification scheme(2), these Koc values suggest that glutaraldehyde is expected to have very high to moderate mobility in soil.

13 Other adverse effects

Harmful to aquatic life.

13. Disposal considerations

13 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.

14. Transport information

14 UN Number

ADR/RID: UN2922 IMDG: UN2922 IATA: UN2922

14 UN Proper Shipping Name

ADR/RID: CORROSIVE LIQUID,TOXIC, N.O.S. (Glutaral) IMDG: CORROSIVE LIQUID, TOXIC, N.O.S. (Glutaral) IATA: CORROSIVE LIQUID, TOXIC, N.O.S. (Glutaral)

14 Transport hazard class(es)

ADR/RID: 8, 6.1, IMDG: 8, 6.1, IATA: 8, 6.1,

14 Packing group, if applicable

ADR/RID: II IMDG: II IATA: II

15 Environmental hazards

ADR/RID: Yes IMDG: Yes IATA: Yes

15 Special precautions for user

no data available

15 Transport in bulk according to IMO instruments

no data available

15. Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
pentanedial	Glutaaral (glutaaraldehyde)	111-30-8	203-856-5
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.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

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:

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/

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.
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