SAFETY DATA SHEET

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

1.1 Product identifiers

Product name: Pyruvaldehyde solution
Product Number: W296902
Brand: Aldrich
CAS-No.: 78-98-8

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

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Corrosive to Metals (Category 1), H290
Serious eye damage (Category 1), H318
Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 2), H341

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word: Danger
Hazard statement(s)
H290  May be corrosive to metals.
H317  May cause an allergic skin reaction.
H318  Causes serious eye damage.
H341  Suspected of causing genetic defects.

Precautionary statement(s)
P201  Obtain special instructions before use.
P202  Do not handle until all safety precautions have been read and understood.
P234  Keep only in original container.
P261  Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P272  Contaminated work clothing must not be allowed out of the workplace.
P280  Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352  IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 + P310  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313  IF exposed or concerned: Get medical advice/ attention.
P333 + P313  If skin irritation or rash occurs: Get medical advice/ attention.
P363  Wash contaminated clothing before reuse.
P390  Absorb spillage to prevent material damage.
P405  Store locked up.
P406  Store in corrosive resistant container with a resistant inner liner.
P501  Dispose of contents/ container to an approved waste disposal plant.

P302 + P352  IF ON SKIN: Wash with plenty of soap and water.
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P501  Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures
Synonyms : Acetylformaldehyde
           Methyglyoxalsolution
           Pyruvaldehyde
           Pyruvic aldehyde

Formula : C₃H₄O₂
Molecular weight : 72.06 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyruvaldehyde</td>
<td>Flam. Liq. 4; Met. Corr. 1; Acute Tox. 4; Eye Dam. 1; Skin Sens. 1B; Muta. 2; H227, H290, H302, H318, H317, H341</td>
<td>&gt;= 30 - &lt; 50 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.
SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Mixture with combustible ingredients. Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.
SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Storage conditions
No metal containers.
Tightly closed.

Storage stability
Recommended storage temperature
2 - 8 °C

Storage class
Storage class (TRGS 510): 8A: Combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls
Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
Personal protective equipment

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

**Skin protection**
required

**Body Protection**
protective clothing

**Respiratory protection**
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

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**SECTION 9: Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

- **a) Appearance** Form: viscous liquid
- **b) Odor** No data available
- **c) Odor Threshold** No data available
- **d) pH** No data available
- **e) Melting point/freezing point** No data available
- **f) Initial boiling point and boiling range** No data available
- **g) Flash point** () No data available
- **h) Evaporation rate** No data available
- **i) Flammability (solid, gas)** No data available
- **j) Upper/lower flammability or explosive limits** No data available
- **k) Vapor pressure** No data available
- **l) Vapor density** No data available
- **m) Density** 1.178 g/mL at 25 °C (77 °F)
  - Relative density No data available
- **n) Water solubility** soluble
- **o) Partition coefficient: n-octanol/water** No data available
p) Autoignition temperature No data available
q) Decomposition temperature No data available
r) Viscosity No data available
s) Explosive properties Not classified as explosive.
t) Oxidizing properties none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong bases, Bases, Oxidizing agents, Strong oxidizing agentsMetals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Mixture

Acute toxicity
Oral: No data available
Acute toxicity estimate Oral - 3,450 mg/kg
(Calculation method)

Inhalation: No data available

Symptoms: Possible symptoms:; mucosal irritations
Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Mixture causes serious eye damage.
Respiratory or skin sensitization
Mixture may cause an allergic skin reaction.

Germ cell mutagenicity
No data available
Evidence of genetic defects.

Carcinogenicity
IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

Components
Pyruvaldehyde

Acute toxicity
LD50 Oral - Rat - male and female - 1,380 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - male and female - 4 h - > 17.9 mg/l - dust/mist
(OECD Test Guideline 403)
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin-irritant effect in animal experiments. - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irreversible effects on the eye
**Respiratory or skin sensitization**
Maximization Test - Guinea pig
Result: Causes sensitization.

**(OECD Test Guideline 406)**

**Germ cell mutagenicity**
In vitro tests showed mutagenic effects
Test Type: In vitro mammalian cell gene mutation test
Test system: *Saccharomyces cerevisiae*
Result: positive
Remarks: (ECHA)
Method: OECD Test Guideline 474
Species: Rat - male - Liver cells
Result: positive

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

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**SECTION 12: Ecological information**

12.1 **Toxicity**

- **Mixture**
  No data available

12.2 **Persistence and degradability**
No data available

12.3 **Bioaccumulative potential**
No data available

12.4 **Mobility in soil**
No data available

12.5 **Results of PBT and vPvB assessment**
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 **Endocrine disrupting properties**
No data available

12.7 **Other adverse effects**
No data available
Components
Pyruvaldehyde
  Toxicity to fish: static test LC50 - Leuciscus idus (Golden orfe) - ca. 1,000 mg/l - 96 h
  Remarks: (ECHA)
  Toxicity to daphnia and other aquatic invertebrates: static test EC50 - Daphnia magna (Water flea) - 404 mg/l - 48 h
  Remarks: (ECHA)
  Toxicity to algae: static test ErC50 - Desmodesmus subspicatus (green algae) - 731.5 mg/l - 72 h
  Remarks: (ECHA)
  Toxicity to bacteria: static test EC50 - Pseudomonas putida - 11 mg/l - 17 h (DIN 38421 TEIL 8)

SECTION 13: Disposal considerations
13.1 Waste treatment methods
Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information
DOT (US)
UN number: 3265  Class: 8  Packing group: III
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Pyruvaldehyde)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3265  Class: 8  Packing group: III  EMS-No: F-A, S-B
Proper shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Pyruvaldehyde)

IATA
UN number: 3265  Class: 8  Packing group: III
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Pyruvaldehyde)

SECTION 15: Regulatory information
SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.
SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

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. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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