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

1.1 Product identifiers
Product name : Formamide
Product Number : F9037
Brand : Sigma
Index-No. : 616-052-00-8
CAS-No. : 75-12-7

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)
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - repeated exposure, Oral (Category 2), Blood, H373
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)
H351  Suspected of causing cancer.
H360  May damage fertility or the unborn child.
H373  May cause damage to organs (Blood) through prolonged or repeated exposure if swallowed.

Precautionary statement(s)
P201  Obtain special instructions before use.
P202  Do not handle until all safety precautions have been read and understood.
P260  Do not breathe mist or vapors.
P280  Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313  IF exposed or concerned: Get medical advice/ attention.
P405  Store locked up.
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
3.1 Substances
Synonyms: Amide C1
          Formic amide

Formula:  CH₃NO
Molecular weight:  45.04 g/mol
CAS-No.:  75-12-7
EC-No.:  200-842-0
Index-No.:  616-052-00-8

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formamide</td>
<td>Carc. 2; Repr. 1B; STOT RE 2; H351, H360, H373</td>
<td>&lt;= 100 %</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. 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
Nitrogen oxides (NOx)
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
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
Suppress (knock down) gases/vapors/mists with a water spray jet. 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. Chemizeorb®). 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

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage stability
Recommended storage temperature
2 - 8 °C

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formamide</td>
<td>75-12-7</td>
<td>TWA</td>
<td>1 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks: Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>10 ppm 15 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
</tbody>
</table>

Potential for dermal absorption
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). Safety glasses

**Skin protection**
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Latex gloves
Minimum layer thickness: 0.6 mm
Break through time: 480 min
Material tested: Lapren® (KCL 706 / Aldrich Z677558, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 240 min
Material tested: KCL 741 Dermatril® L

**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.
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: viscous liquid
   Color: colorless

b) Odor
   odorless

c) Odor Threshold
   Not applicable

d) pH
   4 - 10 at 200 g/l at 20 °C (68 °F)

e) Melting point/freezing point
   Melting point/range: 2 - 3 °C (36 - 37 °F) - lit.

f) Initial boiling point and boiling range
   210 °C 410 °F - lit.

g) Flash point
   152 °C (306 °F)

h) Evaporation rate
   No data available

i) Flammability (solid, gas)
   No data available

j) Upper/lower flammability or explosive limits
   Upper explosion limit: 19 % (V)
   Lower explosion limit: 2.7 % (V)

k) Vapor pressure
   0.08 hPa at 20 °C (68 °F)

l) Vapor density
   1.56 - (Air = 1.0)

m) Density
   1.134 g/cm3 at 25 °C (77 °F) - lit.
   Relative density
   No data available

n) Water solubility
   completely miscible

o) Partition coefficient: n-octanol/water
   log Pow: -0.82 at 25 °C (77 °F) - Bioaccumulation is not expected.

p) Autoignition temperature
   > 500 °C (> 932 °F) at 1,013.25 hPa

q) Decomposition temperature
   > 180 °C (> 356 °F) -

r) Viscosity
   No data available

s) Explosive properties
   No data available

t) Oxidizing properties
   none

9.2 Other safety information

Dissociation constant
   -0.48 at 20 °C (68 °F)

Relative vapor density
   1.56 - (Air = 1.0)
SECTION 10: Stability and reactivity

10.1 Reactivity
Forms explosive mixtures with air on intense heating. A range from approx. 15 Kelvin below the flash point is to be rated as critical.

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

10.3 Possibility of hazardous reactions
Exothermic reaction with:
- Oxidizing agents
- bases
- Risk of explosion with:
  - furfuryl alcohol
  - Oxides of phosphorus
  - hydrogen peroxide
  - iodine
  - with pyridine
  - and
  - Sulfur trioxide
A risk of explosion and/or of toxic gas formation exists with the following substances:
- water separating agents
- Possible formation of:
  - Hydrogen cyanide (hydrocyanic acid)

10.4 Conditions to avoid
Heat.
Strong heating.

10.5 Incompatible materials
No data available

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

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity
LD50 Oral - Rat - male and female - 5,325 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - male - 4 h - > 21 mg/l - vapor

(OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - > 3,000 mg/kg
Remarks: (ECHA)
No data available
**Skin corrosion/irritation**
- Skin - Rabbit
  - Result: No skin irritation - 20 h
  - Remarks: (ECHA)

**Serious eye damage/eye irritation**
- Eyes - Rabbit
  - Result: slight irritation
  - (OECD Test Guideline 405)

**Respiratory or skin sensitization**
- No data available

**Germ cell mutagenicity**
- Test Type: Ames test
- Test system: Escherichia coli/Salmonella typhimurium
- Metabolic activation: with and without metabolic activation
- Method: OECD Test Guideline 471
  - Result: negative
- Test Type: in vitro test
- Test system: Other cell types
  - Metabolic activation: without metabolic activation
  - Result: positive
- Test Type: in vitro test
  - Test system: Embryo
    - Metabolic activation: without metabolic activation
    - Result: negative
    - Remarks: (ECHA)

Test Type: In vivo micronucleus test
- Species: Mouse
- Cell type: Red blood cells (erythrocytes)
- Application Route: Oral
- Method: OECD Test Guideline 474
  - Result: negative

Test Type: In vivo micronucleus test
- Species: Mouse
- Cell type: Bone marrow
- Application Route: Intraperitoneal injection
- Method: OECD Test Guideline 474
  - Result: positive

Test Type: Genotoxicity in vivo
- Species: Drosophila melanogaster
  - Application Route: Intraperitoneal injection
  - Method: OECD Test Guideline 477
    - Result: negative

Test Type: dominant lethal test
- Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 478
Result: negative

**Carcinogenicity**
Suspected of causing cancer.

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**
May damage the unborn child.

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

**Specific target organ toxicity - repeated exposure**
Oral - May cause damage to organs through prolonged or repeated exposure.
- Blood

**Aspiration hazard**
No data available

11.2 **Additional Information**
Repeated dose toxicity - Rat - male and female - Oral - 90 d - NOAEL (No observed adverse effect level) - 40 - 80 mg/kg
Remarks: Subchronic toxicity

Repeated dose toxicity - Rat - male - Inhalation - 14 Days

Repeated dose toxicity - Rat - male and female - Dermal - 90 d - NOAEL (No observed adverse effect level) - 100 mg/kg

RTECS: LQ0525000
Gastrointestinal disturbance
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Possible effect after contact with substance:
ataxia (impaired locomotor coordination)

Absorption may result in damage of the following:
Liver
Kidney

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.
SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish static test LC50 - Leuciscus idus (Golden orfe) - 6,569 mg/l - 96 h (DIN 38412 part 15)

Toxicity to daphnia and other aquatic invertebrates static test EC50 - Daphnia magna (Water flea) - > 500 mg/l - 48 h (Regulation (EC) No. 440/2008, Annex, C.2)

Toxicity to algae static test ErC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 96 h (DIN 38412)

Toxicity to bacteria static test EC50 - activated sludge - > 1,000 mg/l - 30 min (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: 99 % - Readily biodegradable. (OECD Test Guideline 301A)

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
When discharged properly, no impairments in the function of adapted biological wastewater treatment plants are to be expected.
Discharge into the environment must be avoided.

Adsorbed organic bound halogens Remarks: Product does not contain any organic halogens. (AOX)
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.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Formamide</td>
<td>75-12-7</td>
<td>2022-11-30</td>
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</tbody>
</table>

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
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<tbody>
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Pennsylvania Right To Know Components

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<th>CAS-No.</th>
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<tr>
<td>Formamide</td>
<td>75-12-7</td>
<td>2022-11-30</td>
</tr>
</tbody>
</table>
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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Version: 6.11 Revision Date: 05/24/2023 Print Date: 09/16/2023