

# SAFETY DATA SHEET

Version 6.10  
Revision Date 08/08/2024  
Print Date 08/09/2024

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

### 1.1 Product identifiers

Product name : Formic acid  
Product Number : 399388  
Brand : SIGALD  
Index-No. : 607-001-00-0  
CAS-No. : 64-18-6

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

Identified uses : Laboratory chemicals, Synthesis of substances  
Uses advised against : This product is not intended for consumer use. The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 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)

Flammable liquids (Category 3), H226  
Acute toxicity, Oral (Category 4), H302  
Acute toxicity, Inhalation (Category 3), H331

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Skin corrosion (Category 1B), H314  
Serious eye damage (Category 1), H318

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 Statements

H226 Flammable liquid and vapor.  
H302 Harmful if swallowed.  
H314 Causes severe skin burns and eye damage.  
H331 Toxic if inhaled.

Precautionary Statements

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.  
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.  
P264 Wash skin thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P271 Use only outdoors or in a well-ventilated area.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
  
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. 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/ shower.  
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.  
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.  
P363 Wash contaminated clothing before reuse.  
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.  
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.  
P403 + P235 Store in a well-ventilated place. Keep cool.  
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

### 3.2 Mixtures

Formula : CH<sub>2</sub>O<sub>2</sub>  
Molecular weight : 46.03 g/mol

Component	Classification	Concentration
<b>Formic acid</b>		
CAS-No.	64-18-6	Flam. Liq. 3; Acute Tox. 4; Acute Tox. 3; Skin Corr. 1A; Eye Dam. 1; H226, H302, H331, H314, H318 Concentration limits: > 78.5 %: Acute Tox. 3, H331; 75 - 78.5 %: Acute Tox. 4, H332; > 75 %: , EUH071; >= 90 %: Skin Corr. 1A, H314; 10 - < 90 %: Skin Corr. 1B, H314; 2 - < 10 %: Skin Irrit. 2, H315; 2 - < 10 %: Eye Irrit. 2, H319;
EC-No.	200-579-1	
Index-No.	607-001-00-0	
Registration number	01-2119491174-37- XXXX	
		>= 78.5 - < 90 %

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

No data available

### 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

No data available

### 5.2 Special hazards arising from the substance or mixture

Carbon oxides  
Nature of decomposition products not known.  
Combustible.

### 5.3 Advice for firefighters

No data available

## **5.4 Further information**

No data available

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## **SECTION 6: Accidental release measures**

### **6.1 Personal precautions, protective equipment and emergency procedures**

For personal protection see section 8.

### **6.2 Environmental precautions**

No data available

### **6.3 Methods and materials for containment and cleaning up**

No data available

### **6.4 Reference to other sections**

For disposal see section 13.

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## **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**

No data available

### **7.3 Specific end use(s)**

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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## **SECTION 8: Exposure controls/personal protection**

### **8.1 Control parameters**

**Ingredients with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
Formic acid	64-18-6	TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5 ppm 9 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		TWA	5 ppm 9 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	10 ppm 19 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	5 ppm 9 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

#### Derived No Effect Level (DNEL)

Application Area	Routes of exposure	Health effect	Value
Workers	Inhalation	Long-term local effects, Long-term systemic effects	9.5 mg/m <sup>3</sup>
Workers	Inhalation	Acute local effects, Acute systemic effects	19 mg/m <sup>3</sup>
Consumers	Inhalation	Acute local effects, Acute systemic effects	9.5 mg/m <sup>3</sup>
Consumers	Inhalation	Long-term local effects, Long-term systemic effects	3 mg/m <sup>3</sup>

#### Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	1.5 mg/kg
Sea water	0.22 mg/l
Fresh water	2 mg/l
Sea sediment	1.34 mg/kg
Fresh water sediment	13.4 mg/kg
Sewage treatment plant	7.2 mg/l
Aquatic intermittent release	1 mg/l

## 8.2 Exposure controls

### Personal protective equipment

#### Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm  
Break through time: 480 min  
Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nature latex/chloroprene  
Minimum layer thickness: 0.6 mm  
Break through time: 480 min  
Material tested: Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

### **Control of environmental exposure**

Prevent product from entering drains.

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## **SECTION 9: Physical and chemical properties**

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

a) Appearance	Form: clear, liquid Color: colorless
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	2.2 at 2.2 g/l at 20 °C (68 °F)
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	100 °C 212 °F
g) Flash point	48 °C (118 °F)
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 57 %(V) Lower explosion limit: 18 %(V)
k) Vapor pressure	No data available
l) Vapor density	No data available
m) Density	No data available
Relative density	No data available

- |    |   |                     |
|----|---|---------------------|
| n) | Water solubility                          | completely miscible |
| o) | Partition coefficient:<br>n-octanol/water | log Pow: -0.54      |
| p) | Autoignition<br>temperature               | No data available   |
| q) | Decomposition<br>temperature              | No data available   |
| r) | Viscosity                                 | No data available   |
| s) | Explosive properties                      | No data available   |
| t) | Oxidizing properties                      | No data available   |

## 9.2 Other safety information

No data available

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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No data available

### 10.2 Chemical stability

Stable under recommended storage conditions.

### 10.3 Possibility of hazardous reactions

No data available

### 10.4 Conditions to avoid

No data available

### 10.5 Incompatible materials

Strong oxidizing agents, Strong bases, Powdered metals

### 10.6 Hazardous decomposition products

In the event of fire: see section 5

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## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Mixture

#### Acute toxicity

Acute toxicity estimate Oral - 829.55 mg/kg

(Calculation method)

LD50 Oral - Rat - male and female - 730 mg/kg (Formic acid)

(OECD Test Guideline 401)

Acute toxicity estimate Inhalation - 4 h - 8.92 mg/l - vapor (Calculation method)

LC50 Inhalation - Rat - male and female - 4 h - 7.85 mg/l - vapor

(Formic acid)

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(OECD Test Guideline 403)  
Dermal: No data available

**Skin corrosion/irritation**

Remarks: Mixture causes burns.

Skin - Rabbit (Formic acid)

Result: Causes severe burns.

(OECD Test Guideline 404)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Serious eye damage/eye irritation**

Remarks: Causes serious eye damage.

conjunctivitis

Lacrimal irritation due to vapours.

**Respiratory or skin sensitization**

Buehler Test - Guinea pig (Formic acid)

Result: negative

(OECD Test Guideline 406)

Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals. (Formic acid)

**Germ cell mutagenicity**

Test Type: Ames test

(Formic acid)

Test system: Salmonella typhimurium

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

Test Type: sister chromatid exchange assay

(Formic acid)

Test system: Chinese hamster lung cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 479

Result: negative

Test Type: sister chromatid exchange assay

(Formic acid)

Test system: Human lymphocytes

Metabolic activation: without metabolic activation

Method: OECD Test Guideline 479

Result: negative

Test Type: In vitro mammalian cell gene mutation test

(Formic acid)

Test system: Chinese hamster ovary cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 476

Result: negative

Test Type: Chromosome aberration test in vitro

(Formic acid)

Test system: Chinese hamster ovary cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 473

Result: negative

(Formic acid)



Test Type: gene mutation test  
Species: Drosophila melanogaster

Application Route: Oral  
Method: OECD Test Guideline 477  
Result: negative

### **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

### **Specific target organ toxicity - single exposure**

Corrosive to the respiratory tract. (Formic acid)

### **Specific target organ toxicity - repeated exposure**

No data available

### **Aspiration hazard**

No data available

## **11.2 Additional Information**

Repeated dose toxicity - Rat - male and female - Oral - 52 Weeks - NOAEL (No observed adverse effect level) - 400 mg/kg - LOAEL (Lowest observed adverse effect level) - 2,000 mg/kg

Remarks: (in analogy to similar products)  
(Formic acid)

RTECS: LQ4900000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting (Formic acid)  
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. (Formic acid)

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Kidney - Irregularities - Based on Human Evidence

Kidney - Irregularities - Based on Human Evidence  
(Formic acid)

## Components

### Formic acid

#### Acute toxicity

LD50 Oral - Rat - male and female - 730 mg/kg

(OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 4 h - 7.85 mg/l - vapor

(OECD Test Guideline 403)

Dermal: No data available

#### Skin corrosion/irritation

Skin - Rabbit

Result: Causes severe burns.

(OECD Test Guideline 404)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

#### Serious eye damage/eye irritation

Remarks: Causes serious eye damage.  
conjunctivitis

Lacrimal irritation due to vapours.

#### Respiratory or skin sensitization

Buehler Test - Guinea pig

Result: negative

(OECD Test Guideline 406)

Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

#### Germ cell mutagenicity

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Test Type: sister chromatid exchange assay

Test system: Chinese hamster lung cells

Result: negative

Test Type: sister chromatid exchange assay

Test system: Human lymphocytes

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: Chinese hamster ovary cells

Result: negative

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Result: negative

Method: OECD Test Guideline 477

Species: Drosophila melanogaster - male

Result: negative

#### Carcinogenicity

No data available

#### Reproductive toxicity

No data available

**Specific target organ toxicity - single exposure**

Corrosive to the respiratory tract.

**Specific target organ toxicity - repeated exposure****Aspiration hazard**

No data available

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**SECTION 12: Ecological information****12.1 Toxicity****Mixture**

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - 130 mg/l - 96 h (Formic acid) (OECD Test Guideline 203) Remarks: The value is given in analogy to the following substances: ammonium formate
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 365 mg/l - 48 h (Formic acid) (OECD Test Guideline 202) Remarks: The value is given in analogy to the following substances: ammonium formate
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata - 1,240 mg/l - 72 h (Formic acid) (OECD Test Guideline 201) Remarks: The value is given in analogy to the following substances: ammonium formate
Toxicity to bacteria	static test NOEC - activated sludge - 72 mg/l - 13 d (Formic acid) Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - $\geq$ 100 mg/l - 21 d (Formic acid) (OECD Test Guideline 211)

**12.2 Persistence and degradability**

Biodegradability	aerobic - Exposure time 14 d (Formic acid) Result: 100 % - Readily biodegradable. (OECD Test Guideline 301C)
Biochemical Oxygen Demand (BOD)	86 mg/g (Formic acid) Remarks: (External MSDS)
Ratio BOD/ThBOD	8.60 % (Formic acid)

**12.3 Bioaccumulative potential**

Bioaccumulation is unlikely.

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Does not significantly accumulate in organisms.

#### 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

##### Components

##### Formic acid

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - 130 mg/l - 96 h (OECD Test Guideline 203) Remarks: The value is given in analogy to the following substances: ammonium formate
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 365 mg/l - 48 h (OECD Test Guideline 202) Remarks: The value is given in analogy to the following substances: ammonium formate
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata - 1,240 mg/l - 72 h (OECD Test Guideline 201) Remarks: The value is given in analogy to the following substances: ammonium formate
Toxicity to bacteria	static test NOEC - activated sludge - 72 mg/l - 13 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - >= 100 mg/l - 21 d (OECD Test Guideline 211)

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### SECTION 13: Disposal considerations

#### 13.1 Waste treatment methods

No data available

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**SECTION 14: Transport information****DOT (US)**

UN number: 1779 Class: 8 (3) Packing group: II  
Proper shipping name: Formic acid  
Reportable Quantity (RQ):  
Poison Inhalation Hazard: No

**IMDG**

UN number: 1779 Class: 8 (3) Packing group: II EMS-No: F-E, S-C  
Proper shipping name: FORMIC ACID

**IATA**

UN number: 1779 Class: 8 (3) Packing group: II  
Proper shipping name: Formic acid

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**SECTION 15: Regulatory information****CERCLA Reportable Quantity**

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Formic acid	64-18-6	5000	

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

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

**SARA 311/312 Hazards** : Fire Hazard  
Acute Health Hazard  
Chronic Health Hazard

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

Formic acid 64-18-6 >= 70 - < 90 %

**US State Regulations****Massachusetts Right To Know**

Formic acid 64-18-6  
water 7732-18-5

**Pennsylvania Right To Know**

Formic acid 64-18-6

**Maine Chemicals of High Concern**

water 7732-18-5

**Vermont Chemicals of High Concern**

water

7732-18-5

**Washington Chemicals of High Concern**

water

7732-18-5

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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**SECTION 16: Other information**

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact [mlsbranding@sial.com](mailto:mlsbranding@sial.com).

Version: 6.10

Revision Date: 08/08/2024

Print Date: 08/09/2024