

**SAFETY DATA SHEET**

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 06/21/2017

Version 1.1

**SECTION 1. Identification****Product identifier**

Product number	533002
Product name	Formic acid 98% - 100% for LC-MS LiChropur®
CAS-No.	64-18-6

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

Identified uses	Reagent for analysis
-----------------	----------------------

**Details of the supplier of the safety data sheet**

Company	EMD Millipore Corporation   290 Concord Road, Billerica, MA 01821, United States of America   General Inquiries: +1-978-715-4321   Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.
---------	---

<b>Emergency telephone</b>	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week
----------------------------	--

**SECTION 2. Hazards identification****GHS Classification**

Flammable liquid, Category 3, H226  
Acute toxicity, Category 4, Oral, H302  
Acute toxicity, Category 3, Inhalation, H331  
Skin corrosion, Category 1A, H314  
Serious eye damage, Category 1, H318

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

**GHS-Labeling***Hazard pictograms**Signal Word*

Danger

*Hazard Statements*

H226 Flammable liquid and vapor.  
H302 Harmful if swallowed.

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number 533002  
Product name Formic acid 98% - 100% for LC-MS LiChropur®

Version 1.1

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 + 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 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
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/doctor.  
P321 Specific treatment (see supplemental first aid instructions on this label).  
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.

### **Other hazards**

None known.

---

### **SECTION 3. Composition/information on ingredients**

Formula	HCOOH	CH <sub>2</sub> O <sub>2</sub> (Hill)
Molar mass	46.03 g/mol	

### **Hazardous ingredients**

*Chemical name (Concentration)*

CAS-No.

*Formic acid (>= 90 % - <= 100 % )*

64-18-6

Exact percentages are being withheld as a trade secret.

---

### **SECTION 4. First aid measures**

#### **Description of first-aid measures**

*General advice*

First aider needs to protect himself.

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

### *Inhalation*

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

### *Skin contact*

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

### *Eye contact*

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

### *Ingestion*

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation!). Call a physician immediately. Do not attempt to neutralize.

Never give anything by mouth to an unconscious person.

### **Most important symptoms and effects, both acute and delayed**

conjunctivitis, Dermatitis

Irritation and corrosion, Cough, Shortness of breath

Risk of blindness!

### **Indication of any immediate medical attention and special treatment needed**

No information available.

---

## **SECTION 5. Fire-fighting measures**

### **Extinguishing media**

#### *Suitable extinguishing media*

Water, Foam, Carbon dioxide (CO<sub>2</sub>), Dry powder

#### *Unsuitable extinguishing media*

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

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

Combustible.

Vapors are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapors possible in the event of fire.

### **Advice for firefighters**

#### *Special protective equipment for fire-fighters*

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

#### *Further information*

Suppress (knock down) gases/vapors/mists with a water spray jet.

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

---

## **SECTION 6. Accidental release measures**

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

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

## Environmental precautions

Do not let product enter drains. Risk of explosion.

## 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 with liquid-absorbent and neutralizing material (e.g. Chemizorb® H<sup>+</sup>, Art. No. 101595).

Dispose of properly. Clean up affected area.

---

## SECTION 7. Handling and storage

### Precautions for safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.

Observe label precautions.

#### *Advice on protection against fire and explosion*

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

### Conditions for safe storage, including any incompatibilities

#### *Requirements for storage areas and containers*

No metal containers.

May decompose forming gaseous products, especially when stored over long periods. Close containers in such a way to enable internal pressure to escape (e.g. excess pressure valve). Dry. Keep in a well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons. Protected from light.

Store at +15°C to +25°C (+59°F to +77°F).

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

## SECTION 8. Exposure controls/personal protection

### Exposure limit(s)

#### Ingredients

Basis	Value	Threshold limits	Remarks
<i>Formic acid 64-18-6</i>			
ACGIH	Time Weighted Average (TWA):	5 ppm	
	Short Term Exposure Limit (STEL):	10 ppm	
NIOSH/GUIDE	Recommended exposure limit (REL):	5 ppm 9 mg/m <sup>3</sup>	
OSHA_TRANS	PEL:	5 ppm 9 mg/m <sup>3</sup>	
Z1A	Time Weighted Average (TWA):	5 ppm 9 mg/m <sup>3</sup>	

### Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

### Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

### Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

### Eye/face protection

Tightly fitting safety goggles

### Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

### Other protective equipment:

Flame retardant antistatic protective clothing.

### Respiratory protection

required when vapors/aerosols are generated.

## SECTION 9. Physical and chemical properties

Physical state

liquid

Color

colorless

## SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

Odor	stinging
Odor Threshold	0.02 - 49.1 ppm
pH	2.2 at 10 g/l 68 °F (20 °C)
Melting point	39 °F (4 °C)  Method: OECD Test Guideline 102
Boiling point/boiling range	214 °F (101 °C) at 1,013 hPa
Flash point	121.1 °F (49.5 °C) at 1,013 hPa  Method: Tested according to Directive 92/69/EEC.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	12 %(V)
Upper explosion limit	38 %(V)
Vapor pressure	42 hPa at 68 °F (20 °C) Method: OECD Test Guideline 104
Relative vapor density	1.59
Density	1.22 g/cm <sup>3</sup> at 68 °F (20 °C) Method: OECD Test Guideline 109
Relative density	No information available.
Water solubility	at 68 °F (20 °C) soluble
Partition coefficient: n-octanol/water	log Pow: -2.1 (23 °C) OECD Test Guideline 107 Bioaccumulation is not expected.
Autoignition temperature	982 °F(528 °C) at 1,008 hPa Method: Tested according to Directive 92/69/EEC.

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

Decomposition temperature	662 °F (350 °C) Method: OECD Test Guideline 113 GLP: yes
Viscosity, dynamic	1.8 mPa.s at 68 °F (20 °C) Method: OECD Test Guideline 114
Explosive properties	Not classified as explosive.
Oxidizing properties	none
Corrosion	< 3.7 mm/a negligible

---

## SECTION 10. Stability and reactivity

### Reactivity

Vapor/air-mixtures are explosive at intense warming.

### Chemical stability

heat-sensitive

Sensitivity to light

### Possibility of hazardous reactions

Risk of ignition or formation of inflammable gases or vapors with:

Aluminum

Risk of explosion with:

organic nitro compounds, sodium hypochlorite, hydrogen peroxide, furfuryl alcohol

Generates dangerous gases or fumes in contact with:

alkalines, Strong oxidizing agents, sulfuric acid, nonmetallic oxides, metal catalysts, Oxides of phosphorus, Nitric acid, nitrates

Exothermic reaction with:

alkaline earth hydroxides, alkali hydroxides, bases, Amines

### Conditions to avoid

Heating.

### Incompatible materials

Metals

### Hazardous decomposition products

no information available

---

## SECTION 11. Toxicological information

### Information on toxicological effects

*Likely route of exposure*

Inhalation, Eye contact, Skin contact

---

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

## *Target Organs*

Eyes

Skin

Respiratory system

## *Acute oral toxicity*

LD50 Rat: 730 mg/kg

OECD Test Guideline 401

absorption

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

## *Acute inhalation toxicity*

LC50 Rat: 7.85 mg/l; 4 h ; vapor

OECD Test Guideline 403

Symptoms: burns of mucous membranes, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Lung edema  
absorption

## *Skin irritation*

Rabbit

Result: Causes burns.

OECD Test Guideline 404

Causes severe burns.

Dermatitis

## *Eye irritation*

Causes serious eye damage. conjunctivitis Lacrimal irritation due to vapors.

Risk of blindness!

## *Sensitization*

Buehler Test Guinea pig

Result: negative

Method: OECD Test Guideline 406

## *Genotoxicity in vitro*

sister chromatid exchange assay

Chinese hamster lung cells

Result: negative

Method: OECD Test Guideline 479

Ames test

Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 471

In vitro mammalian cell gene mutation test

Chinese hamster ovary cells

Result: negative

Method: OECD Test Guideline 476

## *Carcinogenicity*

Did not show carcinogenic effects in animal experiments. (IUCLID)



## SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

### *Reproductive toxicity*

No impairment of reproductive performance in animal experiments. (IUCLID)

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

The substance or mixture is not classified as specific target organ toxicant, single exposure.

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

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

### *Aspiration hazard*

Regarding the available data the classification criteria are not fulfilled.

## **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.

OSHA

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

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.

ACGIH

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

## **Further information**

After absorption:

acidosis, hemolysis

Damage to:

Kidney

This substance should be handled with particular care.

---

## **SECTION 12. Ecological information**

### **Ecotoxicity**

#### *Toxicity to fish*

LC50 *Leuciscus idus* (Golden orfe): 46 - 100 mg/l; 96 h (IUCLID)

#### *Toxicity to daphnia and other aquatic invertebrates*

EC50 *Daphnia magna* (Water flea): 34.2 mg/l; 48 h (IUCLID)

#### *Toxicity to algae*

IC50 *Desmodesmus subspicatus* (green algae): 27 mg/l; 72 h (Lit.)

#### *Toxicity to bacteria*

EC10 activated sludge: 72 mg/l; 13 d (External MSDS)

EC50 *Pseudomonas putida*: 47 mg/l; 17 h (IUCLID)

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

*Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)*  
semi-static test NOEC Daphnia magna (Water flea):  $\geq 100$  mg/l; 21 d

Analytical monitoring: yes

OECD Test Guideline 211

## **Persistence and degradability**

*Biodegradability*

100 %; 28 d; aerobic

OECD Test Guideline 301C

Readily biodegradable.

## **Bioaccumulative potential**

*Partition coefficient: n-octanol/water*

log Pow: -2.1 (23 °C)

OECD Test Guideline 107

Bioaccumulation is not expected.

*Bioaccumulation*

(Does not significantly accumulate in organisms.)

## **Mobility in soil**

No information available.

## **Other adverse effects**

*Henry constant*

0.019 Pa·m<sup>3</sup>/mol

at 77 °F(25 °C)

*Surface tension*

71.5 mN/m

at 68 °F(20 °C)

Method: OECD Test Guideline 115

*Additional ecological information*

Forms corrosive mixtures with water even if diluted. Harmful effect due to pH shift. Neutralization possible in waste water treatment plants. No interference with wastewater treatment plants are to be expected when used properly.

Discharge into the environment must be avoided.

---

## **SECTION 13. Disposal considerations**

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SAFETY DATA SHEET  
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number 533002  
Product name Formic acid 98% - 100% for LC-MS LiChropur®

Version 1.1

---

**SECTION 14. Transport information**

**Land transport (DOT)**

UN number UN 1779  
Proper shipping name FORMIC ACID  
Class 8 (3)  
Packing group II  
Environmentally hazardous --

**Air transport (IATA)**

UN number UN 1779  
Proper shipping name FORMIC ACID  
Class 8 (3)  
Packing group II  
Environmentally hazardous --  
Special precautions for user yes  
**Not permitted for transport**

**Sea transport (IMDG)**

UN number UN 1779  
Proper shipping name FORMIC ACID MORE THAN 85%  
Class 8 (3)  
Packing group II  
Environmentally hazardous --  
Special precautions for user yes  
EmS F-E S-C

---

**SECTION 15. Regulatory information**

**United States of America**

**SARA 313**

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

*Ingredients*

Formic acid	64-18-6	99 %
-------------	---------	------

**SARA 302**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

---

## Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

### *Ingredients*

Formic acid

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

### *Ingredients*

Formic acid

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

## DEA List I

Not listed

## DEA List II

Not listed

## US State Regulations

### Massachusetts Right To Know

#### *Ingredients*

Formic acid

### Pennsylvania Right To Know

#### *Ingredients*

Formic acid

### New Jersey Right To Know

#### *Ingredients*

Formic acid

### California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

## Notification status

TSCA: All components of the product are listed in the TSCA-inventory.

DSL: All components of this product are on the Canadian DSL

---

## SECTION 16. Other information

### Training advice

Provide adequate information, instruction and training for operators.

# SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number

533002

Version 1.1

Product name

Formic acid 98% - 100% for LC-MS LiChropur®

## Labeling

### Hazard pictograms



### 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.

EUH071 Corrosive to the respiratory tract.

### Precautionary Statements

#### Prevention

P210 Keep away from heat.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

#### Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

### Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapor.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.

### Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at [www.wikipedia.org](http://www.wikipedia.org).

Revision Date 06/21/2017

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

All rights reserved. Millipore and the "M" Mark are registered trademarks of Merck KGaA, Darmstadt, Germany.