

SAFETY DATA SHEET

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

Revision Date 03/02/2020

Version 2.2

SECTION 1. Identification

Product identifier

Product number	FX0440
Product name	Formic Acid 98% GR ACS
CAS-No.	64-18-6

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

Identified uses	Reagent for analysis
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Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation 400 Summit Drive Burlington Massachusetts 01803 United States of America General Inquiries: +1 800-645-5476 Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.
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Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week
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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

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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.

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

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None known.

SECTION 3. Composition/information on ingredients

Formula	HCOOH	CH ₂ O ₂ (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.

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. Remove contact lenses.

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.

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SECTION 5. Fire-fighting measures

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.

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

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 carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

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SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

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

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. Close containers in such a way to enable internal pressure to escape.

Dry. Protected from light.

Keep container tightly closed in a dry and 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.

Store at room temperature.

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Components

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 ³	
OSHA_TRANS	PEL:	5 ppm 9 mg/m ³	
Z1A	Time Weighted Average (TWA):	5 ppm 9 mg/m ³	

Engineering measures

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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

full contact:

Glove material:	polychloroprene
Glove thickness:	0.65 mm
Break through time:	480 min

splash contact:

Glove material:	natural latex
Glove thickness:	0.6 mm
Break through time:	60 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 720 Camapren® (full contact), KCL 706 Lapren® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests according to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. 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).

Other protective equipment:

Flame retardant antistatic protective clothing.

Respiratory protection

required when vapors/aerosols are generated.

Recommended Filter type: Filter E-(P3)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are performed according to the instructions of the producer.

These measures have to be properly documented.

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SECTION 9. Physical and chemical properties

Physical state	liquid
Color	colorless
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 ³ at 68 °F (20 °C) Method: OECD Test Guideline 109

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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.
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

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

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

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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

Target Organs

Eyes

Skin

Respiratory system

Acute oral toxicity

LD50 Rat: 730 mg/kg

OECD Test Guideline 401

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

Skin irritation

Rabbit

Result: Causes burns.

OECD Test Guideline 404

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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)

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 component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated

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NTP carcinogens.
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
Other dangerous properties can not be excluded.
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)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

semi-static test NOEC *Daphnia magna* (Water flea): ≥ 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

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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

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.

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)

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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:

Components

Formic acid	64-18-6	99 %
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SARA 302

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

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Clean Water Act

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

Components

Formic acid

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

Components

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

Components

Formic acid

Pennsylvania Right To Know

Components

Formic acid

New Jersey Right To Know

Components

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.

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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.

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The branding on the header and/or footer of this document may temporarily not visually

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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.

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.

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