

## MATERIAL SAFETY DATA SHEET

Date Printed: 05/29/2007

Date Updated: 03/20/2007

Version 1.3

## Section 1 - Product and Company Information

Product Name FORMIC ACID, 88%, A.C.S. REAGENT  
Product Number 399388  
Brand SIAL

Company Sigma-Aldrich  
Address 3050 Spruce Street  
SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832  
Fax: 800-325-5052  
Emergency Phone: 314-776-6555

## Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
FORMIC ACID <90%	64-18-6	Yes

Formula CH2O2  
Synonyms Acide formique (French) \* Acido formico (Italian)  
\* Ameisensaure (German) \* Aminic acid \* Formic  
acid (ACGIH:OSHA) \* Formic acid \* Hydrogen  
carboxylic acid \* Kwas metaniowy (Polish) \*  
Kyselina mravenci (Czech) \* Methanoic acid \*  
Mierenzuur (Dutch) \* RCRA waste number U123

RTECS Number: LQ4900000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Corrosive.  
Harmful if swallowed. Causes burns.  
Target organ(s): Kidneys. Liver. Combustible.

## HMIS RATING

HEALTH: 3\*  
FLAMMABILITY: 2  
REACTIVITY: 0

## NFPA RATING

HEALTH: 3  
FLAMMABILITY: 2  
REACTIVITY: 0

\*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

## Section 4 - First Aid Measures

## ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is  
conscious. Call a physician. Do not induce vomiting.

#### INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

#### DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

#### EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

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#### Section 5 - Fire Fighting Measures

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##### FLASH POINT

149 °F 65 °C

##### EXPLOSION LIMITS

Lower: 12 % Upper: 38 %

##### AUTOIGNITION TEMP

540 °C

##### FLAMMABILITY

N/A

##### EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

##### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.  
Specific Hazard(s): Emits toxic fumes under fire conditions.  
Combustible liquid.

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#### Section 6 - Accidental Release Measures

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##### PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

##### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

##### METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

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#### Section 7 - Handling and Storage

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##### HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

##### STORAGE

Suitable: Keep tightly closed. Keep away from heat and open

flame. Store in a cool dry place.

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## Section 8 - Exposure Controls / PPE

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### ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.  
Hand: Compatible chemical-resistant gloves.  
Eye: Chemical safety goggles.  
Other: Faceshield (8-inch minimum).

### GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

### EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	STEL	10 PPM
USA	ACGIH	TWA	5 PPM
USA	MSHA Standard-air	TWA	5 PPM (9 MG/M3)
USA	OSHA.	PEL	8H TWA 5 PPM (9 MG/M3)
New Zealand	OEL		
Remarks:	check ACGIH TLV		
USA	NIOSH	TWA	5 PPM

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## Section 9 - Physical/Chemical Properties

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Appearance	Physical State: Liquid	
Property	Value	At Temperature or Pressure
Molecular Weight	46.03 AMU	
pH	2.2	20 °C Concentration: 2.2 g/l
BP/BP Range	100.8 °C	760 mmHg
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	44.8 mmHg	20 °C
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	1.19 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: - 0.540	
Decomposition Temp.	N/A	
Flash Point	149 °F 65 °C	
Explosion Limits	Lower: 12 %	

Flammability	Upper: 38 %
Autoignition Temp	N/A
Refractive Index	540 °C
Optical Rotation	1.37
Miscellaneous Data	N/A
Solubility	N/A
	Solubility in Water: Miscible.
	Other Solvents: GLYCEROL MISCIBLE WITH
	ALCOHOL, ETHER VERY SOLUBLE

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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## Section 11 - Toxicological Information

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### ROUTE OF EXPOSURE

Skin Contact: Causes burns.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes burns.

Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: Harmful if swallowed.

### SENSITIZATION

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

### TARGET ORGAN(S) OR SYSTEM(S)

Blood. Central nervous system. Liver. Kidneys.

### SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

### TOXICITY DATA

Oral

Woman

2.44 mg/kg

LDLO

Remarks: Vascular: Shock. Blood: Other hemolysis with or without anemia. Nutritional and Gross Metabolic: Changes in: Metabolic acidosis.

Oral

Rat  
1100 mg/kg  
LD50  
Remarks: Behavioral:Somnolence (general depressed activity).  
Lungs, Thorax, or Respiration:Dyspnea.

Inhalation  
Rat  
15,000 mg/m3  
LC50  
Remarks: Behavioral:Somnolence (general depressed activity).  
Lungs, Thorax, or Respiration:Dyspnea.

Oral  
Mouse  
700 mg/kg  
LD50  
Remarks: Behavioral:Somnolence (general depressed activity).  
Lungs, Thorax, or Respiration:Dyspnea.

Inhalation  
Mouse  
6,200 mg/m3  
LC50  
Remarks: Behavioral:Somnolence (general depressed activity).  
Lungs, Thorax, or Respiration:Dyspnea.

Intraperitoneal  
Mouse  
940 MG/KG  
LD50

Intravenous  
Mouse  
145 MG/KG  
LD50

Oral  
Dog  
4000 mg/kg  
LD50

#### IRRITATION DATA

Skin  
Rabbit  
Remarks: Severe irritation effect

Skin  
Rabbit  
610 mg  
Remarks: Open irritation test

Eyes  
Rabbit  
122 mg  
Remarks: Severe irritation effect

#### CHRONIC EXPOSURE - MUTAGEN

Species: Human  
Dose: 10 MMOL/L  
Cell Type: lymphocyte

Mutation test: Sister chromatid exchange

Species: Hamster

Dose: 10 MMOL/L

Cell Type: ovary

Mutation test: Cytogenetic analysis

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## Section 12 - Ecological Information

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No data available.

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## Section 13 - Disposal Considerations

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### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

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## Section 14 - Transport Information

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### DOT

Proper Shipping Name: Formic acid

UN#: 1779

Class: 8

Packing Group: Packing Group II

Hazard Label: Corrosive

Hazard Label: Flammable liquid

PIH: Not PIH

### IATA

Proper Shipping Name: Formic acid

IATA UN Number: 1779

Hazard Class: 8

Packing Group: II

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## Section 15 - Regulatory Information

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### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: C

Indication of Danger: Corrosive.

R: 34

Risk Statements: Causes burns.

S: 26-36/37/39-45

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Corrosive.

Risk Statements: Harmful if swallowed. Causes burns.

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Statements: Target organ(s): Kidneys. Liver. Combustible.

### UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes

DEMINIMIS: 1 %

NOTES: This product is subject to SARA section 313 reporting requirements.

TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

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Section 16 - Other Information

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DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

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 Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.