SAFETY DATA SHEET

1. Identification

Product Name: Formic acid (> 85%)
Cat No.: A118P-4; A118P-100; A118P-500; A119P-1; A119P-4; A119P-4LC; A119P-20; A119P-500; BP1215-500

Synonyms: Methanoic acid; (Certified ACS/Laboratory/Aldehyde-Free/Sequencing)

Recommended Use: Laboratory chemicals

Uses advised against: No Information available

Company: Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number: CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) Identification

Classification:
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids</td>
<td>Category 3</td>
</tr>
<tr>
<td>Skin Corrosion/irritation</td>
<td>Category 1 A</td>
</tr>
<tr>
<td>Serious Eye Damage/Eye Irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Target Organs - Respiratory system</td>
<td></td>
</tr>
<tr>
<td>Specific target organ toxicity - (repeated exposure)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Target Organs - Kidney, Liver</td>
<td></td>
</tr>
</tbody>
</table>

Label Elements:

Signal Word: Danger

Hazard Statements:
Flammable liquid and vapor
Causes severe skin burns and eye damage
May cause respiratory irritation
May cause damage to organs through prolonged or repeated exposure
Precautionary Statements

**Prevention**
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wash face, hands and any exposed skin thoroughly after handling
- Wear protective gloves/protective clothing/eye protection/face protection
- Use only outdoors or in a well-ventilated area
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking
- Keep container tightly closed
- Ground/bond container and receiving equipment
- Use explosion-proof electrical/ventilating/lighting/equipment
- Use only non-sparking tools
- Take precautionary measures against static discharge
- Keep cool

**Response**
- Immediately call a POISON CENTER or doctor/physician

**Inhalation**
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

**Skin**
- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
- Wash contaminated clothing before reuse

**Eyes**
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

**Ingestion**
- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

**Fire**
- In case of fire: Use CO2, dry chemical, or foam for extinction

**Storage**
- Store locked up
- Store in a well-ventilated place. Keep container tightly closed

**Disposal**
- Dispose of contents/container to an approved waste disposal plant

**Hazards not otherwise classified (HNOC)**
- None identified

### 3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Haz/Non-haz</th>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Formic acid</td>
<td>64-18-6</td>
<td>&gt; 85</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>7732-18-5</td>
<td>&lt; 15</td>
</tr>
</tbody>
</table>

### 4. First-aid measures

**Eye Contact**
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Immediate medical attention is required.
Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation | Immediate medical attention is required. Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device.

Ingestion | Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects | Breathing difficulties. Causes burns by all exposure routes. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

Notes to Physician | Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media | CO2, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media | No information available.

- Flash Point | 50°C / 122°F
- Method - | No information available.

Autoignition Temperature | 520°C / 968°F

Explosion Limits
- Upper | No data available
- Lower | No data available

Sensitivity to mechanical impact | No information available.

Sensitivity to static discharge | No information available.

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products | Carbon monoxide (CO), Carbon dioxide (CO2), Hydrogen.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA
- Health | 3
- Flammability | 2
- Instability | 0
- Physical hazards | N/A

6. Accidental release measures

Personal Precautions | Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions | Should not be released into the environment. See Section 12 for additional ecological Information.
Methods for Containment and Clean Up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling
Use only under a chemical fume hood. Use only non-sparking tools. Use explosion-proof equipment. Do not breathe vapors/dust. Do not ingest. Take precautionary measures against static discharges. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Keep away from open flames, hot surfaces and sources of ignition.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Containers should be vented periodically in order to overcome pressure buildup. Refrigerator/flammables.

8. Exposure controls / personal protection

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>TWA: 5 ppm</td>
<td>(Vacated) TWA: 5 ppm</td>
<td>IDLH: 30 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 10 ppm</td>
<td>(Vacated) TWA: 9 mg/m³</td>
<td>TWA: 5 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 5 ppm</td>
<td>TWA: 9 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 5 ppm</td>
<td>STEL: 10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 9 mg/m³</td>
<td>STEL: 19 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Quebec</th>
<th>Mexico OEL (TWA)</th>
<th>Ontario TWAEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>TWA: 5 ppm</td>
<td>TWA: 5 ppm</td>
<td>TWA: 5 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 9.4 mg/m³</td>
<td>TWA: 9 mg/m³</td>
<td>TWA: 5 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 10 ppm</td>
<td>STEL: 19 mg/m³</td>
<td>STEL: 10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend
ACGIH - American Conference of Industrial Hygiene
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: Immediately Dangerous to Life or Health

Engineering Measures
Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment

Eye/face Protection
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection
Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>pungent</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>2.1 10 g/L aq.sol.</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>8°C / 46.4°F</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>101°C / 213.8°F</td>
</tr>
</tbody>
</table>
9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point</td>
<td>50°C / 122°F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flammability or explosive limits</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>No data available</td>
</tr>
<tr>
<td>Lower</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>44 mbar @ 20 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>No information available.</td>
</tr>
<tr>
<td>Relative Density</td>
<td>1.220</td>
</tr>
<tr>
<td>Solubility</td>
<td>No information available.</td>
</tr>
<tr>
<td>Partition coefficient; n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>520°C / 968°F</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>1.47 mPa.s @ 20 °C</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C H2 O2</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>46.02</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactive Hazard: None known, based on information available.


Conditions to Avoid: Incompatible products. Heat, flames and sparks. Exposure to moist air or water.

Incompatible Materials: Powdered metals, Strong bases, Strong oxidizing agents, Metals

Hazardous Decomposition Products: Carbon monoxide (CO), Carbon dioxide (CO2), Hydrogen

Hazardous Polymerization: Hazardous polymerization does not occur.

Hazardous Reactions: None under normal processing.

11. Toxicological information

Acute Toxicity

Oral LD50: Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50: Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50: Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral (Rat)</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>730 mg/kg</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Toxicologically Synergistic Products: No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation: Causes severe burns by all exposure routes

Sensitization: No information available.

Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen
<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>64-18-6</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

### Mutagenic Effects
No information available.

### Reproductive Effects
No information available.

### Developmental Effects
No information available.

### Teratogenicity
No information available.

### STOT - single exposure
Respiratory system.

### STOT - repeated exposure
Kidney, Liver.

### Aspiration hazard
No information available.

### Symptoms / effects,
both acute and delayed
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

### Endocrine Disruptor Information
No information available

### Other Adverse Effects
See actual entry in RTECS for complete information.

---

### 12. Ecological information

#### Ecotoxicity
Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>EC50 = 25 mg/L/96h</td>
<td>Leuciscus idus: LC50 = 46-100 mg/L/96h</td>
<td>EC50 = 46.7 mg/L/17h</td>
<td>EC50 = 34 mg/L/48h</td>
</tr>
</tbody>
</table>

#### Persistence and Degradability
No information available.

#### Bioaccumulation/ Accumulation
No information available

#### Mobility

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>-0.54</td>
</tr>
</tbody>
</table>

### 13. Disposal considerations

#### Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

<table>
<thead>
<tr>
<th>Component</th>
<th>RCRA - U Series Wastes</th>
<th>RCRA - P Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid - 64-18-6</td>
<td>U123</td>
<td>-</td>
</tr>
</tbody>
</table>

### 14. Transport information

#### DOT
- **UN-No**: UN1779
- **Proper Shipping Name**: FORMIC ACID
14. Transport information

Hazard Class: 8  
Subsidiary Hazard Class: 3  
Packing Group: II

TDG

UN-No: UN1779  
Proper Shipping Name: FORMIC ACID  
Hazard Class: 8  
Packing Group: II

IATA

UN-No: UN1779  
Proper Shipping Name: Formic acid  
Hazard Class: 8  
Subsidiary Hazard Class: 3  
Packing Group: II

IMDG/IMO

UN-No: UN1779  
Proper Shipping Name: Formic acid  
Hazard Class: 8  
Subsidiary Hazard Class: 3  
Packing Group: II

15. Regulatory information

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>CHINA</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>200-579-1</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>231-791-2</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
X - Listed  
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.  
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.  
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.  
P - Indicates a commenced PMN substance  
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.  
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule  
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.  
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).  
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.  
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)  
Not applicable

SARA 313

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>64-18-6</td>
<td>&gt; 85</td>
<td>1.0</td>
</tr>
</tbody>
</table>
SARA 311/312 Hazardous Categorization

- Acute Health Hazard: Yes
- Chronic Health Hazard: Yes
- Fire Hazard: Yes
- Sudden Release of Pressure Hazard: No
- Reactive Hazard: No

Clean Water Act

<table>
<thead>
<tr>
<th>Component</th>
<th>CWA - Hazardous Substances</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>X</td>
<td>5000 lb</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Water</td>
<td>-</td>
<td>1 LB</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Clean Air Act

- Not applicable

OSHA - Occupational Safety and Health Administration

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>5000 lb</td>
<td></td>
</tr>
</tbody>
</table>

California Proposition 65

- This product does not contain any Proposition 65 chemicals.

State Right-to-Know

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

- Reportable Quantity (RQ): Y
- DOT Marine Pollutant: N
- DOT Severe Marine Pollutant: N

U.S. Department of Homeland Security

- This product does not contain any DHS chemicals.

Other International Regulations

- Mexico - Grade: Moderate risk, Grade 2

Canada

- This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

- E Corrosive material
- B2 Flammable liquid
- D2B Toxic materials
16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date
03-Nov-2009
Revision Date
19-Feb-2014
Print Date
19-Feb-2014
Revision Summary
This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS