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**** MATERIAL SAFETY DATA SHEET ****

Formic acid
 45433

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****
 MSDS Name: Formic acid
 Catalog Number: 980019, A119P-100, A119P-4, A119P-500, A119P500, A119P-1,
 A119P-20, A119P-4, A119P-500, B2115-500
 Synonyms: Methanoic acid; Hydrogen carboxylic acid; Amino acid; Formylic acid.
 Company Identification: Fisher Scientific
 1 Reagent Lane
 Fairlawn, NJ 07410

For information, call: 201-796-7100
 Emergency Number: 201-796-7100
 For CHEMTREC assistance, call: 800-424-9300
 For International CHEMTREC assistance, call: 703-527-3887

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
64-18-6	Formic acid	88-99	200-579-1
7732-18-5	Water	1-12	231-791-2

Hazard Symbols: C
 Risk Phrases: 35

**** SECTION 3 - HAZARDS IDENTIFICATION ****
 EMERGENCY OVERVIEW
 Appearance: Clear, colorless liquid. Flash point: 69 deg C.
 Danger! Combustible liquid and vapor. Causes eye and skin burns.
 Causes digestive and respiratory tract burns. Strong reducing agent.
 Fire and explosion risk in contact with oxidizing agents. Corrosive
 to metals. Causes skin irritation and mucous membrane damage.
 Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects
 Eye: Contact with liquid is corrosive to the eyes and causes severe
 burns. Lachrymator (substance which increases the flow of tears).
 May cause corneal edema, ulceration, and scarring.
 Skin: Causes severe skin burns. The severity of injury depends on the
 concentration of the solution and the duration of exposure.
 Ingest: Causes severe digestive tract burns with abdominal pain, vomiting,
 and possible death.
 Inhalation: Causes chemical burns to the respiratory tract.

Chronic: Chronic absorption of formic acid may cause damage to the kidneys,
 which is indicated by albuminuria and hematuria. Chronic skin contact
 may cause sensitization dermatitis, particularly in workers
 previously sensitized to formaldehyde.

**** SECTION 4 - FIRST AID MEASURES ****
 Eyes: In case of contact, immediately flush eyes with plenty of water for
 at least 15 minutes. Get medical aid immediately.
 Skin: In case of contact, immediately flush skin with plenty of water for
 at least 15 minutes while removing contaminated clothing and shoes.
 Get medical aid immediately. Wash clothing before reuse.
 Ingestion: If allowed, do NOT induce vomiting. Get medical aid immediately.
 If victim is fully conscious, give small sips of water. Never give
 anything by mouth to an unconscious person.
 Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial
 respiration. If breathing is difficult, give oxygen. Get medical aid.
 Notes to Physician: Hemodialysis should be considered in severe intoxication. Persons
 with chronic respiratory, skin, kidney, or liver diseases or eye
 disorders may be at increased risk from exposure to this product.
 Antidote: Folic acid may be beneficial by hastening the metabolism of formic
 acid to carbon dioxide.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

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General Information: wear a self-contained breathing apparatus in
 areas in any fire
 pressure-demand, MSHA/NIOSH (approved or equivalent) and full
 protective gear. During a fire, irritating and highly toxic gases
 may be generated by thermal decomposition or combustion. Use water
 spray to keep fire-exposed containers cool. Containers may explode in
 the heat of a fire. Contact with metals may evolve flammable hydrogen
 gas. Vapors are heavier than air and may travel to a source of
 ignition and flash back. Vapors can spread along the ground and
 collect in low or confined areas.
 Extinguish: Use water fog, dry chemical, carbon dioxide, or regular foam.
 Auto-ignition Temperature: 434 deg C (813.20 deg F)
 Flash Point: 69 deg C (156.20 deg F)
 Explosion Limits, Lower: 18 vol %
 Explosion Limits, Upper: 57 vol %
 NFPA Rating: (estimated) Health: 3; Flammability: 2; Instability: 0

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****
 General Information: Use proper personal protective equipment as indicated
 in section 8.
 Spills/Leaks: Absorb spill with inert material (e.g., vermiculite, sand or earth),
 then place in suitable container. Large spills may be neutralized
 with dilute alkaline solutions of soda ash (sodium carbonate,
 Na2CO3), or lime (calcium oxide, CaO). Remove all sources of
 ignition. Use a spark-proof tool. Provide ventilation. Approach spill
 from upwind.

**** SECTION 7 - HANDLING AND STORAGE ****
 Handling: Wash thoroughly after handling. Remove contaminated clothing and
 wash before reuse. Contents may develop pressure upon prolonged
 storage. Do not get in eyes, on skin, or on clothing. Empty
 containers retain product residue, (liquid and/or vapor), and can be
 dangerous. Discard contaminated shoes. Do not pressurize, cut, weld,
 braze, solder, drill, grind, or expose empty containers to heat,
 sparks or open flames. Use only with adequate ventilation. Keep away
 from heat and flame. Do not breathe vapor or mist.
 Storage: Keep refrigerated. (Store below 45C/109F.) Keep from contact with
 oxidizing materials. Corrosives area. Do not store in metal
 containers. Do not store near alkaline substances. Vent
 periodically.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****
 Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or
 utilizing this material should be equipped with an eyewash facility
 and safety shower. Provide adequate general or local exhaust
 ventilation. Keep airborne concentrations below the permissible
 exposure limits.

Chemical Name	Exposure Limits		
	ACGIH	NIOSH	OSHA - Final PELs
Formic acid	5 ppm; 10 ppm STEL	5 ppm TWA; 9 mg/m3 TLV	5 ppm TWA; 9 mg/m3 TWA
Water	none listed	none listed	none listed

OSHA Vacated PELs:
 Formic acid:
 5 ppm TWA; 9 mg/m3 TWA
 Water:
 No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment
 Eyes: Wear chemical goggles and face shield.
 Skin: Wear butyl rubber gloves to prevent skin exposure.
 Clothing: Wear appropriate protective clothing to prevent skin
 exposure.
 Respirators: A respiratory protection program that meets OSHA's 29
 CFR 1910.134 and ANSI Z89.2 Standard must be followed whenever workplace
 conditions warrant a respirator's use.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

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Physical State: Liquid
Color: Clear, colorless
Odor: pungent odor
pH: 2.38 (0.1M aq sol'n)
Vapor Pressure: 35 mm Hg @ 20 deg C
Vapor Density: 2.6 (air=1)
Boiling Point: 1.607mp @ 25 deg C
Freezing/Melting Point: 101 deg C
Decomposition Temperature: 8.4 deg C
Solubility in water: Not available.
Specific Gravity/Density: 1.22 @ 20°C
Molecular Formula: CH2O2
Molecular Weight: 46.02

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability: Keep refrigerated. Formic acid may decompose to carbon monoxide and water or carbon dioxide and hydrogen gas. These decomposition products develop pressure.

Conditions to Avoid: Ignition sources, excess heat, confined spaces.

Incompatibilities with Other Materials: Incompatible with oxidizing agents, strong bases, finely powdered metals, nitromethane, carbon

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, hydrogen gas, formaldehyde.

Hazardous Polymerization: Will not occur.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 64-18-6: L04900000
CAS# 7732-18-5: ZC010000

LD50/LC50: 64-18-6: Draize test, rabbit, eye: 122 mg Severe; Inhalation, mouse: LC50 = 6200 mg/m³/15M; Inhalation, rat: LC50 = 15 gm/m³/5M; Oral, mouse: LD50 = 700 mg/Kg; Oral, rat: LD50 = 1100 mg/Kg.

CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/Kg.
Formic acid

Water: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: No information available.

Neurotoxicity: No information available.

Mutagenicity: Chromatid Exchange: Human, lymphocyte = 10 mmol/L; Cytogenetic Analysis: Human, lymphocyte = 10 mmol/L; Cytogenetic Analysis: Hamster, Ovary = 10 mmol/L.

Other Studies: No data available.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity: Fish: Bluegill/Sunfish, LC50 = 5000 mg/L; 24 Hr. Unspecified water fish: Daphnia magna, 48 Hr. Unspecified water. It has been shown to adsorb to sediment and would probably also be biodegradable. Bioconcentration in aquatic organisms is not important. In the atmosphere, formic acid would be scavenged by rain and dissolve in cloud water where it reacts with dissolved hydroxyl radicals. It also reacts in the vapor phase with hydroxyl radicals (half-life 36 days).

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Chemical waste generators must determine whether a discarded chemical is classified as hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.
RCRA U-Series: CAS# 64-18-6: waste number U123
(Corrosive waste, toxic waste).

**** SECTION 14 - TRANSPORT INFORMATION ****

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US DOT
Shipping Name: FORMIC ACID
Hazard Class: 8
UN Number: UN1779
Packing Group: II
Canadian TDG
No information available.

**** SECTION 15 - REGULATORY INFORMATION ****

US FEDERAL
TSCA

CAS# 64-18-6 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Safety Rule
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.

SARA
CERCLA Hazardous Substances and corresponding RQs
CAS# 64-18-6: 5000 lb final RQ; 2270 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPO.
CAS# 64-18-6: acute, flammable.
Section 313
This material contains Formic acid (CAS# 64-18-6, 88.9%), which is subject to the reporting requirements of Section 313 of SARA title III and 40 CFR Part 372.

Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone Depleters.
This material does not contain any Class 2 Ozone Depleters.
Clean Air Act: 64-18-6 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

STATE
Formic acid can be found on the following state right to know lists:
California, New Jersey, Pennsylvania, Minnesota, Massachusetts, Washington, Wisconsin, Minnesota, Pennsylvania, New York, or NY.
California No Significant Risk Level:
None of the chemicals in this product are listed.
European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: C
Risk Phrases: 3
Safety Phrases: 325 Causes severe burns.
S 26 Do not breathe vapour.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)
CAS# 64-18-6: 1 No information available.
CAS# 7732-18-5: 1 No information available.
United Kingdom
CAS# 64-18-6: 1 No information available.
United Kingdom Maximum Exposure Limits
Canada
CAS# 64-18-6 is listed on Canada's DSL List.
CAS# 7732-18-5 is listed on Canada's DSL List.
This product has a WHMIS classification of B3, E.
CAS# 64-18-6 is listed on Canada's Ingredient Disclosure List.
CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.
Exposure
CAS# 64-18-6: OEL-ARAB Republic of Egypt: TWA 5 ppm (9 mg/m³)
OEL-Australia: TWA 5 ppm (9 mg/m³)
OEL-Austria: TWA 5 ppm (9 mg/m³)
OEL-Belgium: TWA 5 ppm (9 mg/m³)
OEL-Denmark: TWA 5 ppm (9 mg/m³)
OEL-Finland: TWA 5 ppm (9 mg/m³)
OEL-France: STEL 5 ppm (9 mg/m³)
OEL-Germany: TWA 5 ppm (9 mg/m³)
OEL-Hungary: TWA 5 ppm (9 mg/m³)
OEL-Italy: TWA 5 ppm (9 mg/m³)
OEL-Japan: TWA 5 ppm (9 mg/m³)
OEL-Netherlands: TWA 5 ppm (9 mg/m³)
OEL-Norway: TWA 5 ppm (9 mg/m³)
OEL-Sweden: TWA 5 ppm (9 mg/m³)
OEL-Switzerland: TWA 5 ppm (9 mg/m³)
OEL-Taiwan: TWA 5 ppm (9 mg/m³)
OEL-USA: TWA 5 ppm (9 mg/m³)
OEL-UK: TWA 5 ppm (9 mg/m³)
OEL-USA: STEL 10 ppm (18 mg/m³); Skin
OEL-USA: STEL 8 mg/m³

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OEL-JAPAN:TWA 5 ppm (9.4 mg/m³) (9 mg/m³)
OEL-THE NETHERLANDS:TWA 5 ppm (9 mg/m³)
OEL-THE PHILIPPINES:TWA 5 ppm (9 mg/m³)
OEL-RUSSIA:TWA 5 ppm:STEL 1 mg/m³:Skin
OEL-SWITZERLAND:TWA 5 ppm (9 mg/m³):STEL 10 ppm (18 mg/m³)
OEL-UNITED KINGDOM:TWA 5 ppm (9 mg/m³)
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

*** SECTION 16 - ADDITIONAL INFORMATION ***

MSDS Creation Date: 7/23/1999 Revision #8 Date: 3/03/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their purposes. We assume no liability for any claims, losses or damages of any third party or exemplary profits or any special, indirect, incidental, consequential or exemplary damages, however arising, even if the company has been advised of the possibility of such damages.