

Material Safety Data Sheet

1. Product and company identification

Product name	: Formic Acid		
Synonym	: formic acid; aminic acid; formic acid (DOT); formylic acid; hydrogen carboxylic acid; methanoic acid; hydrogencarboxylic acid		
Chemical formula	: CH ₂ O ₂		
Supplier	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 or 800.874.3723	Manufacturer	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 800.874.3723
Product No.	: 0028905 1879500 1892027		
MSDS #	: 1262		
Validation date	: 10/3/2008.		
Print date	: 10/3/2008.		
Responsible name	: MSDS Specialist		
In case of emergency	: CHEMTREC: 800.424.9300 OUTSIDE US: 202.483.7616	Use of Substance/Preparation	: Refer to the instruction booklet for proper and intended use. Otherwise, contact supplier for specific applications.

2. Hazards identification

Physical state	: Liquid. [COLORLESS LIQUID, MAY BE FUMING WITH A PUNGENT, PENETRATING ODOR]
Odor	: PUNGENT
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: DANGER! FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. MAY BE HARMFUL IF SWALLOWED. CAN CAUSE TARGET ORGAN DAMAGE. Flammable liquid. Severely corrosive to the eyes, skin and respiratory system. Causes severe burns. Harmful if swallowed. Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Can cause target organ damage. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects	
Inhalation	: Severely corrosive to the respiratory system.
Ingestion	: Harmful if swallowed. May cause burns to mouth, throat and stomach.
Skin	: Severely corrosive to the skin. Causes severe burns.
Eyes	: Severely corrosive to the eyes. Causes severe burns.

10/3/2008.

1/11

Formic Acid

2. Hazards identification

Potential chronic health effects

Chronic effects	: Can cause target organ damage.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Target organs	: Causes damage to the following organs: kidneys, lungs, liver, upper respiratory tract, skin, eyes, eye, lens or cornea. May cause damage to the following organs: central nervous system (CNS).

Over-exposure signs/symptoms

Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Ingestion	: Adverse symptoms may include the following: stomach pains
Skin	: Adverse symptoms may include the following: pain or irritation redness blistering may occur
Eyes	: Adverse symptoms may include the following: pain watering redness
Medical conditions aggravated by over-exposure	: Pre-existing digestive disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

The substance is classified as dangerous according to Directive 67/548/EEC and its amendments.

Classification	: C; R35
Human health hazards	: Causes severe burns.

See toxicological information (section 11)

3. Composition/information on ingredients

United States

Name		CAS number	%
Formic Acid		64-18-6	98 - 100

Europe

Substance/preparation : Substance

Ingredient name	CAS number	%	EC number	Classification
Formic Acid	64-18-6	98 - 100	200-579-1	C; R35 [1] [2]

There are no ingredients or additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

10/3/2008.

2/11

Formic Acid

3. Composition/information on ingredients

[1] Substance classified with a health or environmental hazard

[2] Substance with a workplace exposure limit

Occupational exposure limits, if available, are listed in section 8.

4. First aid measures

- Inhalation** : Get medical attention immediately. Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Ingestion** : Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Get medical attention immediately. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Eye contact** : Get medical attention immediately. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing or wear gloves.

See section 11 for more detailed information on health effects and symptoms.

5. Fire-fighting measures

- Flammability of the product** : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.

10/3/2008.

Biosciences Division
Pierce

3747 N. Meridian Rd.
PO Box 117

Rockford, IL
61105

(815) 968-0747
(815) 968-7316 Fax

www.thermo.com/pierce

3/11

Formic Acid

5. Fire-fighting measures

- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

- Hazardous combustion products** : Decomposition products may include the following materials:
carbon oxides

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

10/3/2008.

Biosciences Division
Pierce

3747 N. Meridian Rd.
PO Box 117

Rockford, IL
61105

(815) 968-0747
(815) 968-7316 Fax

www.thermo.com/pierce

4/11

Formic Acid

7. Handling and storage

Storage : Do not store above the following temperature: 4°C (39.2°F). Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Product name Exposure limits

United States

formic acid

ACGIH (United States).
STEL: 10 ppm
TWA: 5 ppm

MSHA (United States).
TWA: 5 ppm

OSHA PEL (United States).
TWA: 5 ppm 8 hour(s).

ACGIH TLV (United States, 1/2008).
STEL: 19 mg/m³ 15 minute(s).
STEL: 10 ppm 15 minute(s).
TWA: 9.4 mg/m³ 8 hour(s).
TWA: 5 ppm 8 hour(s).

NIOSH REL (United States, 12/2001).
TWA: 9 mg/m³ 10 hour(s).
TWA: 5 ppm 10 hour(s).

OSHA PEL (United States, 11/2006).
TWA: 9 mg/m³ 8 hour(s).
TWA: 5 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).
TWA: 9 mg/m³ 8 hour(s).
TWA: 5 ppm 8 hour(s).

Europe

formic acid ...%

EU OEL (Europe, 5/2006). Notes: Indicative
Limit value: 9 mg/m³ 8 hour(s).
Limit value: 5 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Formic Acid

8. Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : 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.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Liquid. [COLORLESS LIQUID, MAY BE FUMING WITH A PUNGENT, PENETRATING ODOR]

Flash point : Closed cup: 49.85°C (121.7°F)

Auto-ignition temperature : 520°C (968°F)

Flammable limits : Lower: 18%
Upper: 57%

Color : Colorless.

Odor : PUNGENT

Molecular weight : 46.03 g/mole

Molecular formula : CH₂O₂

pH : 2.38 [Conc. (% w/w): 0.46%]

Boiling/condensation point : 101°C (213.8°F)

Melting/freezing point : 7°C (44.6°F)

Relative density : 1.22

Vapor pressure : 5.3 kPa (40 mm Hg)

Vapor density : 1.59 [Air = 1]

Evaporation rate : 2.1 (Butyl acetate. = 1)

Viscosity : Dynamic: 1.784 mPa·s (1.784 cP)

Dispersibility properties : Dispersible in the following materials: cold water and hot water.

Formic Acid

9 . Physical and chemical properties

Solubility : Easily soluble in the following materials: cold water and hot water.
Soluble in the following materials: acetone.
Partially soluble in the following materials: methanol.

Octanol/water partition coefficient : -0.54

10 . Stability and reactivity

Chemical stability : The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Possibility of hazardous reactions : Will not occur.

11 . Toxicological information

United States

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
formic acid	LD50 Oral	Rat	730 mg/kg	-
	LD50 Oral	Rat	1830 mg/kg	-
	LD50 Oral	Rat	1100 mg/kg	-
	LC50 Inhalation	Rat	15 gm/m3	15 minutes
	Vapor			
LC50 Inhalation	Rat	15 gm/m3	15 minutes	Vapor

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Chemical pneumonitis. Can cause dermatitis and pulmonary edema. Effects may be delayed. Exposure can cause stomach pains, vomiting and diarrhea. Will cause serious damage to the eyes. Lacrimator.

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Europe

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

10/3/2008.

7/11

Formic Acid

11 . Toxicological information

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Other adverse effects : Adverse symptoms include the following: Sensitization is rare, but may occur in persons previously sensitized to formaldehyde.

IDLH : 30 ppm

12 . Ecological information

Environmental effects : Readily biodegradable This product shows a low bioaccumulation potential.

United States

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Octanol/water partition coefficient : -0.54

Bioconcentration factor : Not available.

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Dispose of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*
DOT Classification	UN1779	FORMIC ACID WITH MORE THAN 85% ACID BY MASS	8 (3)	II
IATA-DGR Class	UN1779	FORMIC ACID WITH MORE THAN 85% ACID BY WEIGHT	8 (3)	II

PG* : Packing group

10/3/2008.

8/11

Formic Acid

15 . Regulatory information

United States

HCS Classification

: Combustible liquid
Corrosive material
Target organ effects

U.S. Federal regulations

: TSCA 4(a) proposed test rules: formic acid
United States inventory (TSCA 8b): This material is listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: formic acid
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: formic acid: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: formic acid
Clean Air Act (CAA) 112 accidental release prevention: No products were found.
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

Form R - Reporting requirements

Product name	CAS number	Concentration
: formic acid	64-18-6	98 - 100

Supplier notification

: formic acid	64-18-6	98 - 100
---------------	---------	----------

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Canada

WHMIS (Canada)

: Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class E: Corrosive material

Canadian lists

: **CEPA Toxic substances:** This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Canada inventory

: **Canada inventory:** This material is listed or exempted.

EU regulations

Hazard symbol or symbols



Corrosive

Risk phrases

: R35- Causes severe burns.

10/3/2008.

Biosciences Division
Pierce

3747 N. Meridian Rd.
PO Box 117

Rockford, IL
61105

(815) 968-0747
(815) 968-7316 Fax

www.thermo.com/pierce

9/11

Formic Acid

15 . Regulatory information

Safety phrases

: S23- Do not breathe vapor.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

International regulations

International lists

: **Australia inventory (AICS):** This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Korea inventory (KECI): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Japan inventory (ENCS): This material is listed or exempted.

16 . Other information

Label requirements

: FLAMMABLE LIQUID AND VAPOR. COMBUSTIBLE. CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. MAY BE HARMFUL IF SWALLOWED. CAN CAUSE TARGET ORGAN DAMAGE.

Hazardous Material

Information System (U.S.A.)

Health	3
Flammability	2
Physical hazards	1

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Date of printing

: 10/3/2008.

Date of issue

: 10/3/2008.

Date of previous issue

: No previous validation.

Version

: 1

Indicates information that has changed from previously issued version.

Full text of R-phrases

: R35- Causes severe burns.

referred to in sections 2 and 3 - Europe

Full text of classifications

: C - Corrosive

referred to in sections 2 and 3 - Europe

Notice to reader

10/3/2008.

Biosciences Division
Pierce

3747 N. Meridian Rd.
PO Box 117

Rockford, IL
61105

(815) 968-0747
(815) 968-7316 Fax

www.thermo.com/pierce

10/11

Formic Acid

16 . Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.