FORMIC ACID

FMA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
Formylic acid
Methanoic acid

Liquid Colorless Penetrating odor

Sinks and mixes with water. Freezing point is 47°F.

Keep people away. AVOID CONTACT WITH LIQUID.
Avoid inhalation.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Call fire department.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

Combustible.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Extinguish with water, dry chemical, alcohol foam, or carbon dioxide.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Will burn skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge
Chemical and Physical Treatment:
Neutralize

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 4; Organic acid
2.2 Formula: HCOOH
2.3 IMO/UN Designation: 8.0/1779
2.4 DOT ID No.: 1779
2.5 CAS Registry No.: 64-18-6
2.6 NAERG Guide No.: 153
2.7 Standard Industrial Trade Classification: 51374

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Self-contained breathing apparatus; chemical goggles or face shield; rubber suit, gloves, and shoes.
3.2 Symptoms Following Exposure: Liquid causes skin and eye burns. Vapors are irritating and painful to breath. Vapor exposure may cause nausea and vomiting.
3.3 Treatment of Exposure: INHALATION: move victim to fresh air; give oxygen if breathing is difficult; call a physician. INGESTION: do NOT induce vomiting; give water or milk. SKIN OR EYES: immediately flush affected area with plenty of water for at least 15 min.; get medical care for eyes.
3.4 TLV-TWA: 5 ppm
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: 10 ppm
3.7 Toxicity by Ingestion: Grade 2; oral rat LD_{50} = 1.21 g/kg
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: None
3.10 Vapor (Gas) Irritant Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.
3.11 Liquid or Solid Characteristics: Fairly severe skin irritant; may cause pain and second- degree burns after a few minutes' contact.
3.12 Odor Threshold: Currently not available
3.13 IDLH Value: 30 ppm
3.14 OSHA PEL-TWA: 5 ppm
3.15 OSHA PEL-STEL: Not listed.
3.16 OSHA PEL-Ceiling: Not listed.
3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

4.1 Flash Point: 138°F O.C.
4.2 Flammable Limits in Air: 18%-57%
4.3 Fire Extinguishing Agents: Water, carbon dioxide, dry chemical, or alcohol foam
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Toxic vapor generated in fires
4.6 Behavior in Fire: Not pertinent
4.7 Auto Ignition Temperature: 1114°F
4.8 Electrical Hazards: Not pertinent
4.9 Burning Rate: 0.5 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 2.4 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 2.0 (calc.)
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: No reaction
5.2 Reactivity with Common Materials: No reaction
5.3 Stability During Transport: Stable; May generate carbon monoxide during storage.
5.4 Neutralizing Agents for Acids and Caustics: Flush with water, then neutralize with lime.
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity: 175 mg/1/24 hr/bluegill/TL_m/fresh water
120 ppm/48 hr/daphnia/TL_m/fresh water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 2%, 5 days; 40% (theor.), 5 days
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile:
Bioaccumulation: 0
Damage to living resources: 1
Human Oral hazard: 1
Human Contact hazard: II
Reduction of amenities: XX

7. SHIPPING INFORMATION

7.1 Grades of Purity: Technical, pharmaceutical: 85-95%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Pressure-vacuum
7.5 IMO Pollution Category: D
7.6 Ship Type: 3
7.7 Barge Hull Type: 3

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Corrosive material
8.2 49 CFR Class: 8
8.3 49 CFR Package Group: II
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	2
Instability (Yellow).....	0

8.6 EPA Reportable Quantity: 5000 pounds
8.7 EPA Pollution Category: D
8.8 RCRA Waste Number: U123
8.9 EPA FWPCA List: Yes

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15° C and 1 atm: Liquid
9.2 Molecular Weight: 46.03
9.3 Boiling Point at 1 atm: 214°F = 101°C = 374°K
9.4 Freezing Point: 47.1°F = 8.4°C = 281.6°K
9.5 Critical Temperature: Not pertinent
9.6 Critical Pressure: Not pertinent
9.7 Specific Gravity: 1.22 at 20°C (liquid)
9.8 Liquid Surface Tension: 38 dynes/cm = 0.038 N/m at 15°C
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: Not pertinent
9.11 Ratio of Specific Heats of Vapor (Gas): 1.228
9.12 Latent Heat of Vaporization: 216 Btu/lb = 120 cal/g = 5.02 X 10^5 J/kg
9.13 Heat of Combustion: –2045 Btu/lb = –1136 cal/g = –47.56 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: (est.) –26 Btu/lb = –14 cal/g = –0.6 X 10^5 J/kg
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: 66.05 cal/g
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: 1.5 psia

NOTES

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9.20 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
50	76.650
55	76.450
60	76.240
65	76.030
70	75.820
75	75.610
80	75.410
85	75.200
90	74.990
95	74.780
100	74.570

9.21 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
70	0.511
80	0.515
90	0.518
100	0.522
110	0.526
120	0.530
130	0.534
140	0.538
150	0.542
160	0.546
170	0.550
180	0.553
190	0.557
200	0.561
210	0.565

9.22 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit inch per hour-square foot-F
55	1.905
60	1.904
65	1.902
70	1.901
75	1.899
80	1.898
85	1.896
90	1.894
95	1.893
100	1.891
105	1.890
110	1.888
115	1.886
120	1.885
125	1.883
130	1.882
135	1.880
140	1.879
145	1.877
150	1.875
155	1.874
160	1.872
165	1.871
170	1.869
175	1.868
180	1.866

9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
	NOT PERTINENT

9.24 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
	MISCIBLE

9.25 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
40	0.268
50	0.365
60	0.491
70	0.652
80	0.858
90	1.117
100	1.441
110	1.842
120	2.335
130	2.936
140	3.663
150	4.539
160	5.584
170	6.825
180	8.290
190	10.010
200	12.020
210	14.350

9.26 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
40	0.00230
50	0.00307
60	0.00405
70	0.00528
80	0.00681
90	0.00871
100	0.01104
110	0.01386
120	0.01727
130	0.02135
140	0.02620
150	0.03192
160	0.03864
170	0.04648
180	0.05557
190	0.06607
200	0.07811
210	0.09187

9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
0	0.214
25	0.221
50	0.228
75	0.234
100	0.240
125	0.247
150	0.253
175	0.259
200	0.265
225	0.271
250	0.277
275	0.282
300	0.288
325	0.294
350	0.299
375	0.304
400	0.309
425	0.314
450	0.319
475	0.324
500	0.329
525	0.334
550	0.338
575	0.343
600	0.347