N-BUTYRIC ACID

BRA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
Butanic acid
Butanoic acid
Butyric acid
Ethylacetic acid
Propanecarboxylic acid

Liquid | Colorless | Rancid butter odor

Floats and mixes with water. Freezing point is 23°F.

Restrict access.
Avoid contact with liquid and vapor.
Wear rubber overclothing (including gloves).
Call fire department.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

Combustible.
Extinguish with dry chemicals, alcohol foam, or carbon dioxide.
Water may be ineffective on fire.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled will cause coughing or difficult breathing.
If in eyes, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Will burn skin and eyes.
If swallowed will cause nausea and vomiting.
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 and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

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

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 4; Organic acids
2.2 Formula: $CH_3CH_2CH_2COOH$
2.3 IMO/UN Designation: Not listed
2.4 DOT ID No.: 2820
2.5 CAS Registry No.: 107-92-6
2.6 NAERG Guide No.: 153
2.7 Standard Industrial Trade Classification: 51375

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Self-contained breathing apparatus; rubber gloves; vapor- proof plastic goggles; impervious apron and boots
3.2 Symptoms Following Exposure: Inhalation causes irritation of mucous membrane and respiratory tract; may cause nausea and vomiting. Ingestion causes irritation of mouth and stomach. Contact with eyes may cause serious injury. Contact with skin may cause burns; chemical is readily absorbed through the skin and may cause damage by this route.
3.3 Treatment of Exposure: INHALATION: remove victim to fresh air; give oxygen if breathing is difficult; call a physician. INGESTION: give large amount of water and induce vomiting. EYES: irrigate with water for 15 min. and get medical attention. SKIN: flush affected areas immediately and thoroughly with water.
3.4 TLV-TWA: Not listed.
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Grade 2; oral LD_{50} = 2,940 mg/kg (rat)
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary.
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: 0.001 ppm
3.13 IDLH Value: Not listed.
3.14 OSHA PEL-TWA: Not listed.
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: 166°F O.C. 160°F C.C.
4.2 Flammable Limits in Air: 2.19%-13.4%
4.3 Fire Extinguishing Agents: Dry chemical, ``alcohol'' foam, carbon dioxide
4.4 Fire Extinguishing Agents Not to Be Used: Water may
4.5 Special Hazards of Combustion Products: Currently not available
4.6 Behavior in Fire: Currently not available
4.7 Auto Ignition Temperature: 842°F
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: 2.7 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 23.8 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 8.0 (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: May attack aluminum or other light metals with formation of flammable hydrogen gas.
5.3 Stability During Transport: Stable
5.4 Neutralizing Agents for Acids and Caustics: Flush with water
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity:
400 ppm/*/lethal/fresh water
200 ppm/24 hr/bluegill/TL_m/fresh water
*Time period not specified.
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 1.150 lb/lb, 5 days; 1,450 lb/lb, 20 days
6.4 Food Chain Concentration Potential: Seafood may be tainted following a spill but chemical does not concentrate in food chain.
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: Commercial, 99.5+%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Open
7.5 IMO Pollution Category: B
7.6 Ship Type: 3
7.7 Barge Hull Type: Currently not available

8. HAZARD CLASSIFICATIONS

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

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

8.6 EPA Reportable Quantity: 5000 pounds
8.7 EPA Pollution Category: D
8.8 RCRA Waste Number: Not listed
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: 88.1
9.3 Boiling Point at 1 atm: 327°F = 164°C = 437°K
9.4 Freezing Point: 23°F = –5°C = 268°K
9.5 Critical Temperature: 671.0°F = 355°C = 628.2°K
9.6 Critical Pressure: 764 psia = 52 atm = 5.3 MN/m^2
9.7 Specific Gravity: 0.958 at 20°C
9.8 Liquid Surface Tension: 26.74 dynes/cm = 0.02674 N/m at 20°C
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: 3.0
9.11 Ratio of Specific Heats of Vapor (Gas): 1.079 at 20°C
9.12 Latent Heat of Vaporization: 167 Btu/lb = 92.7 cal/g = 3.88 X 10^5 J/kg
9.13 Heat of Combustion: –10,620 Btu/lb = –5,900 cal/g = –247 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: –82 Btu/lb = –45 cal/g = –1.9 X 10^5 J/kg
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: 30.04 cal/g
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: Low

NOTES

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9.20 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
34	60.980
36	60.910
38	60.840
40	60.770
42	60.700
44	60.630
46	60.560
48	60.490
50	60.420
52	60.360
54	60.290
56	60.220
58	60.150
60	60.080
62	60.010
64	59.940
66	59.870
68	59.800
70	59.730
72	59.660
74	59.590
76	59.520
78	59.450
80	59.380
82	59.310
84	59.250

9.21 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
52	0.500
54	0.500
56	0.500
58	0.500
60	0.500
62	0.500
64	0.500
66	0.500
68	0.500
70	0.500
72	0.500
74	0.500
76	0.500
78	0.500
80	0.500
82	0.500
84	0.500
86	0.500
88	0.500
90	0.500
92	0.500
94	0.500
96	0.500
98	0.500
100	0.500
102	0.500

9.22 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit inch per hour-square foot-F
42	1.129
44	1.129
46	1.129
48	1.129
50	1.129
52	1.129
54	1.129
56	1.129
58	1.129
60	1.129
62	1.129
64	1.129
66	1.129
68	1.129
70	1.129
72	1.129
74	1.129
76	1.129

9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
52	1.928
54	1.889
56	1.852
58	1.815
60	1.779
62	1.745
64	1.711
66	1.678
68	1.646
70	1.615
72	1.585
74	1.556
76	1.527
78	1.499
80	1.472
82	1.445
84	1.419
86	1.394
88	1.369
90	1.345
92	1.322
94	1.299
96	1.277
98	1.255
100	1.234
102	1.213

9.24 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
	M
	I
	S
	C
	I
	B
	L
	E

9.25 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
35	0.002
40	0.003
45	0.003
50	0.004
55	0.006
60	0.007
65	0.009
70	0.011
75	0.014
80	0.018
85	0.022
90	0.027
95	0.033
100	0.041
105	0.050
110	0.060
115	0.072
120	0.087
125	0.104
130	0.124
135	0.147
140	0.174
145	0.205
150	0.241
155	0.283

9.26 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
35	0.00003
40	0.00004
45	0.00005
50	0.00007
55	0.00009
60	0.00011
65	0.00014
70	0.00018
75	0.00022
80	0.00027
85	0.00033
90	0.00041
95	0.00049
100	0.00060
105	0.00072
110	0.00087
115	0.00103
120	0.00123
125	0.00146
130	0.00173
135	0.00203
140	0.00238
145	0.00279
150	0.00325
155	0.00377

9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
0	0.278
20	0.287
40	0.296
60	0.304
80	0.313
100	0.321
120	0.330
140	0.338
160	0.346
180	0.354
200	0.362
220	0.369
240	0.377
260	0.384
280	0.392
300	0.399
320	0.406
340	0.413
360	0.420
380	0.427
400	0.433
420	0.440
440	0.446
460	0.453
480	0.459
500	0.465