SEC-BUTYL ALCOHOL

BAS

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
2-Butanol
Butylene hydrate
2-Hydroxybutane
Methylethylcarbinol

Watery liquid Colorless Alcohol odor

Floats and mixes slowly with water. Flammable, irritating vapor is produced.

Restrict access.
Shut off ignition sources and call fire department.
Avoid contact with liquid and vapor.
Stay upwind and use water spray to ``knock down'' vapor.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

FLAMMABLE.
Flashback along vapor trail may occur.
Vapor may explode if ignited in an enclosed area.
Extinguish with dry chemical or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause headache, dizziness or difficult breathing.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to eyes.
If in eyes, hold eyelids open and flush with plenty of water.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
May be dangerous if it enters water intakes.
Notify local health and pollution control officials.
Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge
Chemical and Physical Treatment: Burn

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 20; Alcohols, glycols
2.2 Formula: $CH_3CH_2CH(OH)CH_3$
2.3 IMO/UN Designation: 3.3/1120
2.4 DOT ID No.: 1120
2.5 CAS Registry No.: 78-92-2
2.6 NAERG Guide No.: 129
2.7 Standard Industrial Trade Classification: 51213

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Organic vapor canister or air-supplied mask; chemical goggles or face splash shield.
3.2 Symptoms Following Exposure: Headache, dizziness, and respiratory irritation. Liquid is severely irritating to the eyes and may cause eyeburn.
3.3 Treatment of Exposure: INHALATION: remove from exposure immediately; call a physician; if breathing is irregular or has stopped, start resuscitation and administer oxygen. INGESTION: induce vomiting and call a physician. EYES: flush with water for at least 15 minutes.
3.4 TLV-TWA: 100 ppm
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Grade 1; LD_{50} = 5-15 g/kg (rat-single oral dose)
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: None
3.10 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
3.11 Liquid or Solid Characteristics: No appreciable hazard. Practically harmless to the skin.
3.12 Odor Threshold: Currently not available
3.13 IDLH Value: 2,000 ppm
3.14 OSHA PEL-TWA: 150 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: 75°F C.C.
4.2 Flammable Limits in Air: 1.7%-9.0%
4.3 Fire Extinguishing Agents: Carbon dioxide, dry chemicals
4.4 Fire Extinguishing Agents Not to Be Used: Water maybe ineffective on fire.
4.5 Special Hazards of Combustion Products: Not pertinent
4.6 Behavior in Fire: Not pertinent
4.7 Auto Ignition Temperature: 763°F
4.8 Electrical Hazards: Class I, Group D
4.9 Burning Rate: 3.1 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 28.6 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 9.0 (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
5.4 Neutralizing Agents for Acids and Caustics: Not pertinent
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity: Currently not available
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): Currently not available
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile:
Bioaccumulation: 0
Damage to living resources: 0
Human Oral hazard: 0
Human Contact hazard: 0
Reduction of amenities: X

7. SHIPPING INFORMATION

7.1 Grades of Purity: 99+%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Open (flame arrester) or pressure-vacuum
7.5 IMO Pollution Category: D
7.6 Ship Type: Data not avaialable
7.7 Barge Hull Type: Currently not available

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Flammable liquid
8.2 49 CFR Class: 3
8.3 49 CFR Package Group: II
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	1
Flammability (Red).....	3
Instability (Yellow).....	0

8.6 EPA Reportable Quantity: Not listed.
8.7 EPA Pollution Category: Not listed.
8.8 RCRA Waste Number: Not listed
8.9 EPA FWPCA List: Not listed

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15° C and 1 atm: Liquid
9.2 Molecular Weight: 74.12
9.3 Boiling Point at 1 atm: 211°F = 99.5°C = 372.7°K
9.4 Freezing Point: –174.5°F = –114.7°C = 158.5°K
9.5 Critical Temperature: 505.0°F = 262.8°C = 536°K
9.6 Critical Pressure: 608.4 psia = 41.39 atm = 4.193 MN/m^2
9.7 Specific Gravity: 0.807 at 20°C (liquid)
9.8 Liquid Surface Tension: 23.0 dynes/cm = .023 N/m at 20°C
9.9 Liquid Water Interfacial Tension: Currently not available
9.10 Vapor (Gas) Specific Gravity: Not pertinent
9.11 Ratio of Specific Heats of Vapor (Gas): 1.080
9.12 Latent Heat of Vaporization: 243 Btu/lb = 135 cal/g = 5.65 X 10^5 J/kg
9.13 Heat of Combustion: –15,500 Btu/lb = –8600 cal/g = –360 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: Currently not available
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: Currently not available
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: 0.2 psia

NOTES

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BAS

9.20 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
35	51.580
40	51.410
45	51.240
50	51.060
55	50.890
60	50.720
65	50.540
70	50.370
75	50.190
80	50.020
85	49.850
90	49.670
95	49.500
100	49.330
105	49.150
110	48.980
115	48.810
120	48.630

9.21 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
0	0.522
5	0.526
10	0.530
15	0.534
20	0.538
25	0.541
30	0.545
35	0.549
40	0.553
45	0.557
50	0.561
55	0.565
60	0.569
65	0.573
70	0.576
75	0.580
80	0.584
85	0.588
90	0.592
95	0.596
100	0.600

9.22 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit inch per hour-square foot-F
45	0.961
50	0.957
55	0.954
60	0.950
65	0.946
70	0.942
75	0.938
80	0.934
85	0.930
90	0.926
95	0.922
100	0.918
105	0.914
110	0.911
115	0.907
120	0.903
125	0.899
130	0.895

9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
35	5.892
40	5.448
45	5.045
50	4.680
55	4.347
60	4.044
65	3.767
70	3.513
75	3.281
80	3.068
85	2.873
90	2.693
95	2.528
100	2.375
105	2.234
110	2.103
115	1.983
120	1.871
125	1.767
130	1.670
135	1.581
140	1.497
145	1.419
150	1.347
155	1.279
160	1.216

9.24 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
68	20.000

9.25 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
40	0.072
50	0.112
60	0.171
70	0.255
80	0.373
90	0.536
100	0.757
110	1.052
120	1.440
130	1.944
140	2.589
150	3.407
160	4.431
170	5.701
180	7.262
190	9.162
200	11.460
210	14.200

9.26 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
40	0.00099
50	0.00151
60	0.00227
70	0.00332
80	0.00478
90	0.00674
100	0.00934
110	0.01276
120	0.01716
130	0.02276
140	0.02981
150	0.03858
160	0.04937
170	0.06252
180	0.07839
190	0.09738
200	0.11990
210	0.14640

9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
0	0.327
20	0.337
40	0.348
60	0.358
80	0.368
100	0.377
120	0.387
140	0.396
160	0.405
180	0.415
200	0.423
220	0.432
240	0.441
260	0.449
280	0.457
300	0.465
320	0.473
340	0.481
360	0.488
380	0.495
400	0.503
420	0.510
440	0.516