BENZONITRILE

BZN

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
Benzoic acid nitrile
Cyanobenzene
Phenylcyanide

Liquid | Colorless | Almond-like odor

May float or sink in water.

KEEP PEOPLE AWAY. AVOID CONTACT WITH LIQUID AND VAPOR.
Call fire department.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

Combustible.
POISONOUS GASES MAY BE PRODUCED IN FIRE.
Wear goggles and self-contained breathing apparatus.
Extinguish with dry chemicals, foam, 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, difficult breathing or loss of consciousness.
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
Irritating to skin and eyes.
If swallowed will cause headache, nausea, vomiting or loss of consciousness.
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.

Water Pollution

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

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Contain
Collection Systems: Skim; Pump; Dredge
Chemical and Physical Treatment: Absorb

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: Not listed.
2.2 Formula: C_6H_5CN
2.3 IMO/UN Designation: Not listed
2.4 DOT ID No.: 2224
2.5 CAS Registry No.: 100-47-0
2.6 NAERG Guide No.: 152
2.7 Standard Industrial Trade Classification: 51484

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Rubber gloves; splash-proof goggles; rubber boots or rubber overshoes; impervious clothing for splash protection; cartridge-type mask or other protection against vapor must be worn for working in poorly ventilated area or where poisoning by inhalation may be possible.

3.2 Symptoms Following Exposure: Benzonitrile may enter the human body by ingestion, absorption through the skin, or inhalation. The earliest symptoms of cyano compound intoxication may be weakness, headaches, confusion, and occasionally nausea and vomiting. The respiratory rate and depth will usually be increased at the beginning and at later stages become slow and gasping. Blood pressure is usually normal, especially in the mild or moderately severe cases, although the pulse rate is usually more rapid than normal.

3.3 Treatment of Exposure: INHALATION: remove patient to fresh air; get immediate medical attention. INGESTION: Call physician immediately. Until physician arrives, take the following steps: a. Provide for inhalation of amyl nitrite vapor from ampules crushed in a handkerchief and held to the nose of the victim. b. Induce vomiting unless patient is unconscious. (Gastric lavage should be employed by, or under the supervision of, a physician.) c. Keep patient warm and quiet until medical attention arrives. EYES: immediately flush with large volumes of water for at least 15 min. SKIN: wash thoroughly at once, without scrubbing, with large amounts of soap and water. OTHER: exposed personnel should be checked periodically for chronic toxic effects.

3.4 TLV-TWA: Not listed.
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: 5 mg/m^3 as cyanide.
3.7 Toxicity by Ingestion: Grade 2; oral rat LD_{50} = 800 mg/kg
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Currently not available
3.11 Liquid or Solid Characteristics: Currently not available
3.12 Odor Threshold: Currently not available
3.13 IDLH Value: 25 mg/m^3 as CN
3.14 OSHA PEL-TWA: 5 mg/m^3 as cyanide.
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: 167°F C.C.
4.2 Flammable Limits in Air: Currently not available
4.3 Fire Extinguishing Agents: Foam, dry chemical, carbon dioxide
4.4 Fire Extinguishing Agents Not to Be Used: Water may be ineffective.
4.5 Special Hazards of Combustion Products: Toxic hydrogen cyanide and oxides of nitrogen may form in fire.
4.6 Behavior in Fire: Currently not available
4.7 Auto Ignition Temperature: Currently not available
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: Difficult to burn
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 44.0 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 10.5 (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: Will attack some plastics
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:
5 ppm/24 hr/rainbow trout/no effect/ fresh water
135 ppm/96 hr/fathead minnow/TL_m/soft fresh water
78 ppm/96 hr/fathead minnow/TL_m/hard fresh water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 60% (theo.), 18 days
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile: Not listed.

7. SHIPPING INFORMATION

7.1 Grades of Purity: Pure, 99+%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: Ventilated (natural)
7.4 Venting: Open (flame arrester)
7.5 IMO Pollution Category: Currently not available
7.6 Ship Type: Currently not available
7.7 Barge Hull Type: Currently not available

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Poison
8.2 49 CFR Class: 6.1
8.3 49 CFR Package Group: II
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification: Not listed
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: 103.12
9.3 Boiling Point at 1 atm: 376°F = 191°C = 464°K
9.4 Freezing Point: 9.0°F = –12.8°C = 260.4°K
9.5 Critical Temperature: 799.2°F = 426.2°C = 699.4°K
9.6 Critical Pressure: 611 psia = 41.6 atm = 4.22 MN/^{2}
9.7 Specific Gravity: 1.01 at 25°C (liquid)
9.8 Liquid Surface Tension: 34.7 dynes/cm = 0.0347 N/m at 25°C
9.9 Liquid Water Interfacial Tension: Currently not available
9.10 Vapor (Gas) Specific Gravity: 3.6
9.11 Ratio of Specific Heats of Vapor (Gas): 1.091
9.12 Latent Heat of Vaporization: 157.7 Btu/lb = 87.6 cal/g = 3.67 X 10^5 J/kg
9.13 Heat of Combustion: –15,100 Btu/lb = –8,400 cal/g = –351 X 10^5 J/kg
9.14 Heat of Decomposition: Currently not available
9.15 Heat of Solution: Currently not available
9.16 Heat of Polymerization: Currently not available
9.17 Heat of Fusion: Currently not available
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: Currently not available

NOTES

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9.20 SATURATED LIQUID DENSITY

Temperature (degrees F)	Pounds per cubic foot
35	64.200
40	64.049
45	63.900
50	63.750
55	63.590
60	63.440
65	63.290
70	63.130
75	62.980
80	62.830
85	62.680
90	62.520
95	62.370
100	62.220

9.21 LIQUID HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
55	0.440
60	0.440
65	0.440
70	0.440
75	0.440
80	0.440
85	0.440
90	0.440
95	0.440
100	0.440
105	0.440
110	0.440
115	0.440
120	0.440
125	0.440
130	0.440
135	0.440
140	0.440

9.22 LIQUID THERMAL CONDUCTIVITY

Temperature (degrees F)	British thermal unit inch per hour-square foot-F
75	1.031
80	1.027
85	1.022
90	1.017
95	1.013
100	1.008
105	1.003
110	0.999
115	0.994
120	0.989
125	0.984
130	0.980
135	0.975
140	0.970
145	0.966
150	0.961
155	0.956
160	0.952
165	0.947
170	0.942
175	0.938
180	0.933
185	0.928
190	0.924
195	0.919
200	0.914

9.23 LIQUID VISCOSITY

Temperature (degrees F)	Centipoise
77	1.250

9.24 SOLUBILITY IN WATER

Temperature (degrees F)	Pounds per 100 pounds of water
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9.25 SATURATED VAPOR PRESSURE

Temperature (degrees F)	Pounds per square inch
110	0.050
120	0.068
130	0.091
140	0.122
150	0.161
160	0.211
170	0.273
180	0.352
190	0.449
200	0.569
210	0.716
220	0.896
230	1.113
240	1.374
250	1.685
260	2.056
270	2.496
280	3.013
290	3.619
300	4.325
310	5.146
320	6.096
330	7.190
340	8.445
350	9.880
360	11.510

9.26 SATURATED VAPOR DENSITY

Temperature (degrees F)	Pounds per cubic foot
110	0.00084
120	0.00112
130	0.00149
140	0.00195
150	0.00253
160	0.00326
170	0.00417
180	0.00528
190	0.00664
200	0.00829
210	0.01028
220	0.01266
230	0.01550
240	0.01886
250	0.02281
260	0.02745
270	0.03286
280	0.03913
290	0.04637
300	0.05470
310	0.06423
320	0.07511
330	0.08746
340	0.10140
350	0.11720
360	0.13500

9.27 IDEAL GAS HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
0	0.202
20	0.211
40	0.220
60	0.228
80	0.236
100	0.244
120	0.252
140	0.260
160	0.267
180	0.275
200	0.282
220	0.289
240	0.296
260	0.303
280	0.310
300	0.316
320	0.323
340	0.329
360	0.335
380	0.341
400	0.347
420	0.353
440	0.358