PARALDEHYDE

PDH

CAUTIONARY RESPONSE INFORMATION

Common Synonyms			
p-Acetaldehyde Paracetaldehyde 2,4,6-Trimethyl-1,3,5-trioxane	Liquid	Colorless	Characteristic aromatic odor
	Floats and mixes with water.		

Keep people away.
Shut off ignition sources and call fire department.
Avoid contact with liquid.
Wear goggles and self-contained breathing apparatus.
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. POISONOUS GASES ARE PRODUCED IN FIRE. Wear goggles and self-contained breathing apparatus. Extinguish with alcohol foam, carbon dioxide, or dry chemical. Water may be ineffective on fire.
Exposure	CALL FOR MEDICAL AID. VAPOR Harmful if inhaled. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID If swallowed, will cause headache, incoordination, drowsiness, or coma. Irritating to eyes and skin. 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.
Water Pollution	Effects of low concentrations on aquatic life are 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

Dilute and disperse
Stop discharge

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: Not listed.
2.2 Formula: $C_6H_{12}O_3$
2.3 IMO/UN Designation: 3.3/1264
2.4 DOT ID No.: 1264
2.5 CAS Registry No.: 123-63-7
2.6 NAERG Guide No.: 129
2.7 Standard Industrial Trade Classification: 51622

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Wear rubber gloves, self-contained breathing apparatus.
3.2 Symptoms Following Exposure: INHALATION AND INGESTION: Irritation, headache, bronchitis, pulmonary edema. Irritating to digestive tract. Hypnotic and analgesic properties. Incoordination and drowsiness, followed by sleep. Larger doses-coma-weak pulse and shallow respiration, cyanosis-death from respiratory paralysis. EYES: irritation-can cause serious injury. SKIN: Dermatitis (skin inflammation).
3.3 Treatment of Exposure: Call a doctor. INHALATION: Remove from exposure, give artificial respiration or oxygen if indicated. EYES: Irrigate with water for 15 minutes. SKIN: Wash contaminated area with soap and water. INGESTION: Gastric lavage, saline catharsis.
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; LD_{50} = 500 to 5000 mg/kg.
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Chronic intoxication-digestive disturbances, thirst, emaciation, muscular weakness, mental fatigue. Tremors of hands and tongue. Can cause skin eruptions. This is addictive.
3.10 Vapor (Gas) Irritant Characteristics: Currently not available
3.11 Liquid or Solid Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of skin.
3.12 Odor Threshold: Currently not available
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: 96°F O.C.
4.2 Flammable Limits in Air: 1.3% (lower limit)
4.3 Fire Extinguishing Agents: Alcohol foam, CO_2, or dry chemical
4.4 Fire Extinguishing Agents Not to Be Used: Water
4.5 Special Hazards of Combustion Products: Emits toxic fumes on heating.
4.6 Behavior in Fire: Can react vigorously when exposed to heat or flame. Vapor is heavier than air and may travel a considerable distance to source of ignition and flash back.
4.7 Auto Ignition Temperature: 460°F
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: Currently not available
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 35.7 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 12.0 (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: Currently not available
5.3 Stability During Transport: Currently not available
5.4 Neutralizing Agents for Acids and Caustics: Not pertinent
5.5 Polymerization: Currently not available
5.6 Inhibitor of Polymerization: Currently not available

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: Currently not available
6.5 GESAMP Hazard Profile:
Bioaccumulation:
Damage to living resources: 2
Human Oral hazard: 1
Human Contact hazard: I
Reduction of amenities: X

7. SHIPPING INFORMATION

7.1 Grades of Purity: Currently not available
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: Currently not available
7.4 Venting: Currently not available
7.5 IMO Pollution Category: C
7.6 Ship Type: 3
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: III
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	2
Flammability (Red).....	3
Instability (Yellow).....	1

8.6 EPA Reportable Quantity: 1000 pounds
8.7 EPA Pollution Category: C
8.8 RCRA Waste Number: U182
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: 132.16
9.3 Boiling Point at 1 atm: 262.4°F = 128°C = 401.2°K
9.4 Freezing Point: 54.7°F = 12.6°C = 285.8°K
9.5 Critical Temperature: 554.0°F = 290°C = 563.2°K
9.6 Critical Pressure: Currently not available
9.7 Specific Gravity: 0.9943 at 20°C
9.8 Liquid Surface Tension: 27.82 dynes/cm = 0.02782 N/m at 5°C
9.9 Liquid Water Interfacial Tension: Currently not available
9.10 Vapor (Gas) Specific Gravity: 4.55
9.11 Ratio of Specific Heats of Vapor (Gas): Currently not available
9.12 Latent Heat of Vaporization: 135 Btu/lb = 75 cal/g = 3.1 X 10^5 J/kg
9.13 Heat of Combustion: At 25°C –10,174 Btu/lb = –5,652 cal/g = 236 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

PARALDEHYDE

PDH

9.20 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
60	62.252
70	61.835
80	61.421
90	61.009
100	60.600
110	60.194
120	59.790
130	59.390
140	58.992
150	58.596
160	58.203
170	57.813
180	57.426
190	57.041

9.21 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
32	0.436

9.22 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit inch per hour-square foot-F
90	1.002
95	0.999
100	0.996
105	0.993
110	0.991
115	0.988
120	0.985
125	0.982
130	0.980
135	0.977
140	0.974
145	0.971
150	0.968
155	0.966
160	0.963
165	0.960
170	0.957
175	0.955

9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
50	1.571
60	1.313
70	1.128
80	0.990
90	0.883
100	0.797
110	0.726
120	0.668
130	0.618
140	0.576
150	0.539
160	0.506
170	0.478
180	0.453
190	0.430
200	0.410
210	0.391
220	0.375
230	0.359
240	0.345

9.24 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
15	11.857
20	11.501
25	11.145
30	10.789
35	10.432
40	10.076
45	9.720
50	9.363
55	9.007
60	8.651
65	8.294
70	7.938
75	7.582
80	7.225
85	6.869
90	6.513
95	6.156
100	5.800

9.25 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
70	1.036
80	3.363
90	5.172
100	6.620
110	7.804
120	8.791
130	9.627
140	10.342
150	10.963
160	11.506
170	11.985
180	12.410
190	12.791
200	13.134
210	13.444
220	13.727
230	13.984
240	14.220
250	14.437
260	14.638

9.26 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
70	0.02066
80	0.05999
90	0.09058
100	0.11505
110	0.13507
120	0.15176
130	0.16588
140	0.17798
150	0.18846
160	0.19764
170	0.20574
180	0.21294
190	0.21938
200	0.22517
210	0.23042
220	0.23518
230	0.23953
240	0.24352
250	0.24720
260	0.25058

9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
	CURRENTLY NOT AVAILABLE