PROPIONIC ANHYDRIDE

PAH

CAUTIONARY RESPONSE INFORMATION

Common Synonyms	Liquid	Colorless	Sharp odor
Methylacetic anhydride Propanoic anhydride Propionyl oxide	Sinks and mixes slowly with water.		

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

Fire	Combustible. Extinguish with water, dry chemicals, alcohol foam, or carbon dioxide.
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. 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
Contain
Collection Systems: Skim; Pump; Dredge
Chemical and Physical Treatment: Burn
Clean shore line

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 11; Organic anhydride
2.2 Formula: $(CH_3CH_2CO)_2O$
2.3 IMO/UN Designation: 8/2496
2.4 DOT ID No.: 2496
2.5 CAS Registry No.: 123-62-6
2.6 NAERG Guide No.: 156
2.7 Standard Industrial Trade Classification: 51377

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Organic canister mask; goggles or face shield; rubber gloves
3.2 Symptoms Following Exposure: Inhalation causes irritation of eyes and respiratory tract. Contact with liquid causes burns of eyes and skin. Ingestion causes burns of mouth and stomach.
3.3 Treatment of Exposure: INHALATION: move victim to fresh air; if breathing has stopped, give artificial respiration. EYES: immediately flush with plenty of water for at least 15 min.; get medical attention. SKIN: immediately flush with plenty of water for at least 15 min. INGESTION: give large amount of water, do NOT induce vomiting.
3.4 TLV-TWA: Not listed.
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg; Grade 2; LD_{50} = 0.5 to 5 g/kg.
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Vapors are moderately irritating such that personnel will not usually tolerate moderate or high concentrations.
3.11 Liquid or Solid Characteristics: Causes smarting of the skin and first-degree burns on short exposure; may cause second-degree burns on long exposure.
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: 156°F O.C. 145°F C.C.
4.2 Flammable Limits in Air: 1.48%-11.9%
4.3 Fire Extinguishing Agents: Water, dry chemical, alcohol foam, carbon dioxide.
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Not pertinent
4.6 Behavior in Fire: Not pertinent
4.7 Auto Ignition Temperature: 545°F
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: 3.0 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 33.3 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 11.0 (calc.)
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: Reacts slowly to form weak propionic acid; the reaction is not hazardous.
5.2 Reactivity with Common Materials: Slowly corrosive if wet
5.3 Stability During Transport: Stable
5.4 Neutralizing Agents for Acids and Caustics: Flush with water, rinse with sodium bicarbonate or lime solution
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity: 50 ppm/48 hr/water fleas/TL_m/fresh water
188 ppm/24 hr/bluegill/TL_m/fresh water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 1.3 lb/lb, 5 days
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile:
Bioaccumulation: 0
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: 97+%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Pressure-vacuum
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: 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).....	1

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: 130.14
9.3 Boiling Point at 1 atm: 336°F = 169°C = 442°K
9.4 Freezing Point: –45°F = –43°C = 230°K
9.5 Critical Temperature: 660.2°F = 349°C = 622.2°K
9.6 Critical Pressure: 490 psia = 33 atm = 3.3 MN/m^2
9.7 Specific Gravity: 1.01 at 20°C (liquid)
9.8 Liquid Surface Tension: 30 dynes/cm = 0.030 N/m at 25°C
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: 4.5
9.11 Ratio of Specific Heats of Vapor (Gas): 1.0543
9.12 Latent Heat of Vaporization: 149 Btu/lb = 83 cal/g = 3.5 X 10^5 J/kg
9.13 Heat of Combustion: (at 15°C) –10,320 Btu/lb = –5,740 cal/g = –240 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: (est.) –36 Btu/lb = –20 cal/g = –0.84 X 10^5 J/kg
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: Low

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
40	63.990	40	0.418	40	0.917	40	1.431
50	63.610	50	0.421	50	0.915	50	1.306
60	63.230	60	0.424	60	0.913	60	1.196
70	62.840	70	0.427	70	0.911	70	1.099
80	62.460	80	0.429	80	0.909	80	1.014
90	62.080	90	0.432	90	0.907	90	0.937
100	61.700	100	0.435	100	0.905	100	0.869
110	61.320	110	0.438	110	0.903	110	0.808
120	60.940	120	0.440	120	0.901	120	0.753
130	60.560	130	0.443	130	0.899	130	0.704
140	60.170	140	0.446	140	0.897	140	0.659
150	59.790	150	0.449	150	0.895	150	0.618
160	59.410	160	0.452	160	0.893	160	0.582
170	59.030	170	0.454	170	0.891	170	0.548
180	58.650	180	0.457	180	0.889	180	0.517
190	58.270	190	0.460	190	0.887	190	0.489
200	57.890	200	0.463	200	0.884	200	0.463
210	57.500	210	0.465	210	0.882	210	0.440

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	I	70	0.025	70	0.00056	0	0.275
	N	80	0.035	80	0.00079	25	0.283
	S	90	0.049	90	0.00109	50	0.291
	O	100	0.069	100	0.00148	75	0.299
	L	110	0.094	110	0.00200	100	0.306
	U	120	0.128	120	0.00267	125	0.314
	B	130	0.172	130	0.00354	150	0.322
	L	140	0.229	140	0.00463	175	0.330
	E	150	0.302	150	0.00600	200	0.338
		160	0.395	160	0.00772	225	0.346
		170	0.512	170	0.00985	250	0.354
		180	0.658	180	0.01247	275	0.362
		190	0.840	190	0.01566	300	0.369
	R	200	1.063	200	0.01953	325	0.377
	E	210	1.337	210	0.02420	350	0.385
	A	220	1.670	220	0.02978	375	0.393
	C	230	2.072	230	0.03642	400	0.401
	T	240	2.556	240	0.04428	425	0.409
	S	250	3.134	250	0.05352	450	0.417
		260	3.821	260	0.06434	475	0.424
	S	270	4.633	270	0.07695	500	0.432
	L	280	5.588	280	0.09157	525	0.440
	O	290	6.707	290	0.10840	550	0.448
	W	300	8.012	300	0.12780	575	0.456
	L	310	9.526	310	0.15000	600	0.464
		320	11.280	320	0.17530		