

# PHTHALIC ANHYDRIDE

PAN

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b> 1,2-Benzenedicarboxylic acid anhydride 1,3-Dioxophthalan PAN Phthalandione Phthalic acid anhydride		Solid flakes or liquid (heated) Colorless or pale yellow Choking odor
Solid sinks in water, liquid solidifies and sinks in 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.		
<b>Fire</b>	Combustible. Extinguish with water, dry chemical, or carbon dioxide.	
<b>Exposure</b>	CALL FOR MEDICAL AID. DUST Irritating to eyes, nose, and throat. If inhaled, with cause coughing. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.  LIQUID OR SOLID Will burn skin or 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 and have victim induce vomiting. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.	
<b>Water Pollution</b>	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: Dredge

### 2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: 11; Organic anhydride
- 2.2 Formula: C<sub>8</sub>H<sub>4</sub>(CO)<sub>2</sub>O
- 2.3 IMO/UN Designation: Not listed
- 2.4 DOT ID No.: 2214
- 2.5 CAS Registry No.: 85-44-9
- 2.6 NAERG Guide No.: 156
- 2.7 Standard Industrial Trade Classification: 51382

### 3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Coveralls and/or rubber apron; rubber shoes or boots; chemical goggles and/or face shield; Bureau of Mines organic vapor respirator (Type AB); gauntlet-type leather or rubber gloves.
- 3.2 **Symptoms Following Exposure:** Solid irritates skin and eyes, causing coughing and sneezing. Liquid causes severe thermal burns.
- 3.3 **Treatment of Exposure:** INHALATION: gargle with water and use a sedative cough mixture. INGESTION: induce vomiting and give water, milk, or vegetable oil. SKIN OR EYE CONTACT: Flush with water for at least 15 min.; if burned by molten material, remove as much solid as possible, soak off the remainder in cold water, and then treat the burn.
- 3.4 TLV-TWA: 1 ppm
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: Not listed.
- 3.7 **Toxicity by Ingestion:** Grade 2; LD<sub>50</sub> = 0.5 to 5 g/kg (rat)
- 3.8 **Toxicity by Inhalation:** Currently not available.
- 3.9 **Chronic Toxicity:** Currently not available
- 3.10 **Vapor (Gas) Irritant Characteristics:** Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.
- 3.11 **Liquid or Solid Characteristics:** Causes smarting of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure.
- 3.12 **Odor Threshold:** 0.32-0.72 mg/m<sup>3</sup>
- 3.13 **IDLH Value:** 60 mg/m<sup>3</sup>
- 3.14 **OSHA PEL-TWA:** 2 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:** 329°F O.C. 305°F C.C.
- 4.2 **Flammable Limits in Air:** 1.7%-10.5%
- 4.3 **Fire Extinguishing Agents:** Water fog, dry chemical, carbon dioxide, or foam
- 4.4 **Fire Extinguishing Agents Not to Be Used:** Water may cause frothing.
- 4.5 **Special Hazards of Combustion Products:** Not pertinent
- 4.6 **Behavior in Fire:** Not pertinent
- 4.7 **Auto Ignition Temperature:** 1058°F
- 4.8 **Electrical Hazards:** Not pertinent
- 4.9 **Burning Rate:** Currently not available
- 4.10 **Adiabatic Flame Temperature:** Currently not available
- 4.11 **Stoichiometric Air to Fuel Ratio:** 35.7 (calc.)
- 4.12 **Flame Temperature:** Currently not available
- 4.13 **Combustion Molar Ratio (Reactant to Product):** 10.0 (calc.)
- 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

### 5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Solid has very slow reaction; no hazard. Liquid spatters when in contact with water.
- 5.2 **Reactivity with Common Materials:** No reaction
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Water and sodium bicarbonate
- 5.5 **Polymerization:** Not pertinent
- 5.6 **Inhibitor of Polymerization:** Not pertinent

### 6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:**  
 >56 ppm/96 hr/fathead minnow/TL<sub>m</sub>/fresh water
- 6.2 **Waterfowl Toxicity:** Currently not available
- 6.3 **Biological Oxygen Demand (BOD):**  
 106%, 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: 1  
 Reduction of amenities: XX

### 7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Flake; molten; commercial; 99.8%
- 7.2 **Storage Temperature:** 268–320°F (liquid); Ambient (solid)
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Open (flame arrester)
- 7.5 **IMO Pollution Category:** C
- 7.6 **Ship Type:** 3
- 7.7 **Barge Hull Type:** 3

### 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)	1
Instability (Yellow)	0
- 8.6 **EPA Reportable Quantity:** 5000 pounds
- 8.7 **EPA Pollution Category:** D
- 8.8 **RCRA Waste Number:** U190
- 8.9 **EPA FWPCA List:** Not listed

### 9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Solid
- 9.2 **Molecular Weight:** 148.12
- 9.3 **Boiling Point at 1 atm:** 544.3°F = 284.6°C = 557.8°K
- 9.4 **Freezing Point:** 268°F = 131°C = 404°K
- 9.5 **Critical Temperature:** Not pertinent
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 1.20 at 135°C (liquid) 1.53 at 20°C (solid)
- 9.8 **Liquid Surface Tension:** 35.5 dynes/cm = 0.0355 N/m at 155°C
- 9.9 **Liquid Water Interfacial Tension:** (est.) 30 dynes/cm = 0.03 N/m at 155°C
- 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:** 189 Btu/lb = 105 cal/g = 4.40 X 10<sup>5</sup> J/kg
- 9.13 **Heat of Combustion:** -9473 Btu/lb = -5263 cal/g = -220.4 X 10<sup>5</sup> J/kg
- 9.14 **Heat of Decomposition:** Not pertinent
- 9.15 **Heat of Solution:** -127 Btu/lb = -70.8 cal/g = -2.96 X 10<sup>5</sup> 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
280	75.049	270	0.395		N	270	1.188
285	74.870	272	0.396		O	275	1.154
290	74.700	274	0.397		T	280	1.121
295	74.530	276	0.397			285	1.089
300	74.349	278	0.398		P	290	1.059
305	74.179	280	0.399		E	295	1.030
310	74.009	282	0.399		R	300	1.002
315	73.830	284	0.400		T	305	0.975
320	73.660	286	0.401		I	310	0.949
325	73.490	288	0.401		N	315	0.924
330	73.309	290	0.402		E	320	0.900
335	73.139	292	0.403		N	325	0.878
340	72.969	294	0.403		T	330	0.855
345	72.790	296	0.404			335	0.834
350	72.620	298	0.405			340	0.814
355	72.440	300	0.405			345	0.794
360	72.270	302	0.406			350	0.775
365	72.099	304	0.407			355	0.757
370	71.919	306	0.407			360	0.739
375	71.750	308	0.408			365	0.722
380	71.580	310	0.409			370	0.706
385	71.400	312	0.409			375	0.690
390	71.230	314	0.410			380	0.674
		316	0.411			385	0.659
		318	0.411			390	0.645
		320	0.412				

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	280	0.207	280	0.00386	0	0.155
	N	300	0.323	300	0.00587	25	0.165
	S	320	0.491	320	0.00869	50	0.175
	O	340	0.728	340	0.01255	75	0.185
	L	360	1.053	360	0.01772	100	0.194
	U	380	1.491	380	0.02449	125	0.203
	B	400	2.070	400	0.03322	150	0.212
	L	420	2.823	420	0.04428	175	0.221
	E	440	3.786	440	0.05807	200	0.230
		460	5.002	460	0.07505	225	0.238
		480	6.516	480	0.09569	250	0.247
		500	8.378	500	0.12050	275	0.255
		520	10.640	520	0.14990	300	0.262
		540	13.370	540	0.18450	325	0.270
		560	16.610	560	0.22480	350	0.278
		580	20.450	580	0.27140	375	0.285
		600	24.940	600	0.32480	400	0.292
		620	30.160	620	0.38550	425	0.299
		640	36.180	640	0.45400	450	0.306
						475	0.312
						500	0.319
						525	0.325
						550	0.331
						575	0.337
						600	0.343