

MATERIAL SAFETY DATA SHEET**PHTHALIC ANHYDRIDE**

PRODUCT CODE NUMBER(S): 5590-5

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: *Phthalic anhydride; Phthalic acid anhydride; 1,2-benzenedicarboxylic acid anhydride; 1,2-isobenzofurandione*

Chemical Family: *Aromatic carboxylic acid anhydride*

Chemical Formula: $C_6H_4(CO)_2O$

Product Use: *Laboratory reagent*

Manufacturer's Name and Address:

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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
<i>Phthalic anhydride</i>	<i>>99</i>	<i>1 ppm</i>	<i>85-44-9</i>

PHYSICAL DATA

Physical State: *Solid*

Odour and Appearance: *White or pale yellow flakes, crystals or powder; characteristic pungent, choking odour*

Odour Threshold (ppm): *0.053 ppm (reported values vary)*

Vapour Pressure (mm Hg): *2.0 x 10⁻⁴ mm Hg at 20°C*

Vapour Density (Air = 1): *5.1*

Evaporation Rate: *Not available*

Boiling Point (degrees C): *284.5°C (sublimes)*

Melting Point (degrees C): *131°C*

pH: *Not applicable (reacts in water to form acidic solutions)*

Specific Gravity: *1.527 at 4°C*

Coefficient of Water/Oil distribution: *Not applicable (reacts)*

SHIPPING DESCRIPTION

UN: 2214

T.D.G. Class: 8

Pkg. Group: III

REACTIVITY DATA

Chemical Stability: *Stable; reacts slowly with water and water vapour to form phthalic acid and heat.*

Incompatibility with other substances: *Can react violently, with risk of fire and explosion, with strong oxidizers, strong mineral or organic acids, reducing agents. Reacts violently with bases, with splattering, temperature and pressure rise. In the presence of moisture and metals (e.g. iron) can form pyrophoric phthalic acid salts. May explode violently on heating with copper (II) oxide or sodium nitrite. Dry phthalic acid is not corrosive to cast iron, steel, stainless steel, nickel and its alloys, or aluminum, but in the presence of water corrodes iron and steel, probably not corrosive to 304 and 316 stainless steels, aluminum. May attack some forms of plastics, rubbers, coatings.*

Reactivity: *Avoid heat, all ignition sources, moisture, generation of dust, all incompatible materials.*

Hazardous Decomposition Products: *CO_x, acid fumes, various hydrocarbons, toxic and flammable vapours.*

FIRE AND EXPLOSION DATA

Flammability: *Can burn if strongly heated. Will ignite if exposed to flame. Combustible as dust. Dust may form explosive mixtures with air. Solid sublimes and gives off flammable vapours when heated.*

Extinguishing Media: *CO₂, dry chemical, alcohol or polymer aqueous film-forming foam, water spray or fog. Water or foam may cause frothing, which can be violent and dangerous to those nearby. Carefully applied, the water fog or spray will cause the frothing to blanket and smother the fire. Use water spray to cool containers, disperse vapours and dust, flush spill away from ignition source. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment (full face-piece, positive-pressure self-contained breathing apparatus) and clothing (encapsulating chemical splash suit) sufficient to prevent inhalation of dust or fumes and contact with skin and eyes (Bunker Gear is not sufficient).*

Flash Point (Method Used): *152°C (CC); 165°C (TOC)*

Autoignition Temperature: *570°C*

Upper Flammable Limit (% by volume): *10.5%*

Lower Flammable Limit (% by volume): *1.7%*

Hazardous Combustion Products: *CO₂, toxic, acrid smoke and fumes, flammable/explosive hydrogen gas.*

Sensitivity to Impact: *None identified*

Sensitivity to Static discharge: *As with most organic powders, mixtures of dust with air may be sensitive under certain conditions, when ignited by an electrostatic or other high-voltage spark, or other ignition source.*

TOXICOLOGICAL PROPERTIES AND HEALTH DATA**Toxicological Data:**

LD₅₀: *(oral, rat) 1,530 mg/kg; (oral, mouse) 1,500 mg/kg; (dermal, rabbit) >10,000 mg/kg*

LC₅₀: *(rat) >210 mg/m³/1h (dust)*

Effects of Acute Exposure to Product:

Inhaled: *Does not readily form vapour at room temperature. Toxic. Dust is irritating to mucous membranes and respiratory tract. 40% of workers exposed to 6.1 to 6.8 mg/m³ of dust for 5 to 30 minutes reported irritation of the nose, 17% reported irritation of the respiratory tract. Symptoms include coughing, choking, shortness of breath, nausea, vomiting, diarrhea. Severe overexposure may cause inflammation, and edema of the larynx and bronchi, pulmonary edema or chemical pneumonitis, unconsciousness, and death. Lesser exposures may cause allergic respiratory reaction.*

In contact with skin: *Pure phthalic acid produces only mild irritation (based on animal information). Molten form can cause severe burns. Solid forms non-irritating phthalic acid on contact with moisture. Often contaminated with maleic anhydride, which forms severely irritating maleic acid. Even 0.5% maleic anhydride can cause burns on contact with moist skin. Higher concentrations may cause corrosive skin damage. Lesser exposures may cause allergic reaction.*

In contact with eyes: *Moderate to severe irritation to eyes, causing redness, pain and blurred vision, temporary corneal damage. Presence of maleic anhydride can cause corrosive damage to eyes (see "In contact with skin").*

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Ingested: Oral toxicity is low. May cause burns to mouth and gastrointestinal irritation, with nausea and vomiting, diarrhea, abdominal pain. Presence of maleic anhydride can increase severity of irritation (see *In contact with skin*). Not a typical route of industrial exposure.

Effects of Chronic Exposure to Product:

Prolonged or repeated exposure may cause skin and pulmonary sensitization. Persons with respiratory sensitization experience wheezing, shortness of breath, runny nose at concentrations that have no effect on unsensitized persons. Persons with skin sensitization experience redness, itching, rash, and swelling, which can spread from the hands and arms to the rest of the body. Persons with skin and pulmonary problems should avoid exposure. May cause liver or kidney damage.

Carcinogenicity: No evidence in animal experiments. No human information available. Not classifiable as human carcinogen.

Teratogenicity: No human or animal information available.

Reproductive Effects: Evidence in animal experiments inconclusive. No human information available.

Mutagenicity: Insufficient information available. Negative in Ames tests.

Synergistic Products: None found

PREVENTIVE MEASURES

Engineering Controls: Local exhaust ventilation required.

Respiratory Protection: Up to 30 mg/m³: NIOSH/OSHA approved dust and mist respirator. Up to 60 mg/m³: dust and mist respirator (not quarter-mask or single-use), or full face respirator with high-efficiency particulate filters, or powered air-purifying respirator with dust and mist filters, or supplied-air respirator, or full face-piece self-contained breathing apparatus. Higher or unknown concentrations, as in fire or spill conditions: full face-piece, positive-pressure self-contained breathing apparatus, or full face-piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus.

Eye Protection: Chemical safety goggles and/or face shield.

Skin Protection: 4H™ gloves. Other protective clothing, apron, sleeves, coveralls, boots, sufficient to prevent contact.

Other Personal Protective Equipment: Safety shower and eye-wash fountain in work area.

Leak and Spill Procedure: Stop or reduce discharge if it can be done safely. Evacuate area. Eliminate all sources of ignition. Ground and bond all equipment. Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent inhalation and contact with skin and eyes. Prevent from entering sewers or waterways. Dike spill to contain and mix with dry sand or other inert absorbent. Residue may be neutralized by mixing with soda ash or sodium bicarbonate solution. Transfer neutralized residue carefully into container and arrange removal by disposal company. Contaminated absorbent may pose the same hazards as the product; treat with caution. Wash site of spillage thoroughly with soda ash solution and water. Discard contaminated clothing.

Waste Disposal: Follow all federal, provincial and local regulations for disposal.

Handling Procedures and Equipment: VERY TOXIC, COMBUSTIBLE AS DUST, CORROSIVE. Persons working with this material must be thoroughly trained in its hazards and its safe use and must wear appropriate protective equipment and clothing. Use the smallest amount possible for the purpose, in a designated area with adequate ventila-

tion. Keep away from heat, flame hot surfaces and all sources of ignition. Ground and bond equipment to prevent static charge accumulation. Avoid procedures which generate dust or mist. Avoid all inhalation and contact with skin, eyes, and clothing. Keep work area clean and free of all extraneous materials. Avoid excessive heat and all ignition sources. CAUTION: empty containers contain hazardous residues; use caution when opening or moving them.

Storage Requirements: Store in suitable, labelled containers in a cool, dry, well-ventilated area, out of direct sunlight, and away from all incompatible materials. Store away from heat and ignition sources. Protect from contact with water. Storage facilities (shelves, floors) should be constructed of non-combustible materials. Keep containers tightly closed when not in use and when empty. Protect from damage. Inspect regularly for signs of leaking.

FIRST AID MEASURES

Specific Measures:

Eyes: Immediately flush eyes with warm running water for at least twenty (20) minutes, holding eyelids open while flushing. Take care not to flush contaminated water into unaffected eye. Wear protective gloves to avoid contact with the chemical during first aid procedures. Get medical advice immediately.

Skin: Remove contaminated clothing (including shoes, watches, belts, and rings). Wear gloves to avoid contact. Immediately flush exposed area with large amounts of warm running water for at least fifteen (15) minutes. Get medical advice immediately. Discard contaminated clothing.

Inhalation: Move victim to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes). Get medical attention IMMEDIATELY. Give oxygen for any breathing difficulty. Give artificial respiration if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse.

Ingestion: If victim is alert and NOT convulsing, give 2 to 4 glasses of water or milk, or milk of magnesia, or the whites of eggs beaten with water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Get medical attention IMMEDIATELY.

REFERENCES USED

CINFO disc

Budavari: The Merck Index, 12th ed., 1997

Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987

Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: July 22, 1991

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MSDS: 5590-5

Proposed WHMIS Designation: D2A; E

Prepared by: Caledon Laboratories Ltd. (905) 877-0101
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