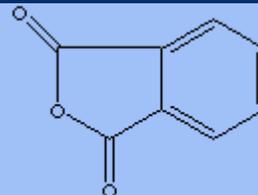


PHTHALIC ANHYDRIDE

PRODUCT IDENTIFICATION

CAS NO.	85-44-9
EINECS NO.	201-607-5
FORMULA	C ₈ H ₄ (CO) ₂ O
MOL WT.	148.12
H.S. CODE	2917.35



TOXICITY Oral rat LD50: 1530 mg/kg

SYNONYMS 1,3-Isobenzofuranidone; 1,3-Dioxophthalan; Phthalandione; 1,3 Phthalandione; 1,2-Benzenedicarboxylic acid anhydride; Phthalic acid anhydride; 1,2-Benzenedicarboxylic anhydride; 1,3-dihydro-1,3-dioxoisobenzofuran;

DERIVATION

CLASSIFICATION [CARBOXYLIC ACID ANHYDRIDES](#) /

GENERAL DESCRIPTION

Phthalic anhydride, the anhydride form of phthalic acid, is produced by the oxidation of orthoxylene and naphthalene. Its wide application is based on the ortho related carboxylic acid groups as their dehydration is highly reactive with broad processing conditions to produce various downstream products. It is used to make simple esters widely used as plasticizers. It is used as in making unsaturated polyester resins, alkyd resins, polyester polyols, dyes and pigments, halogenated anhydrides, polyetherimide resins, isatoic anhydride and insect repellents.

Anhydride is a compound formed by the abstraction of a molecule of water, H₂O, from a substance. The term acid anhydride is restricted sometime to the anhydride formed especially from an acid by dehydration or one that revert to the original substance upon hydration. In case of bimolecular, it can be composed of two molecules of the corresponding acid. The term mixed anhydride is an acid anhydride composed of two different acids. Examples are adenosine triphosphate or an aminoacyl adenylate. The anhydrides of bases are oxides.

Anhydrides of inorganic acids are usually oxides of nonmetallic elements. Carbon dioxide (CO₂) is the anhydride of carbonic acid, dinitrogen pentoxide (N₂O₅) is the anhydride of nitric acid, sodium oxide is an anhydride of sodium hydroxide, phosphorus pentoxide (P₂O₅) is the anhydride of phosphoric acid, and sulfur trioxide (SO₃) is the anhydride of sulfuric acid. An acid anhydride forms an acid; a base anhydride forms a base. Sulfur trioxide (acid anhydride) reacts with water to form sulfuric acid (an acid product). Calcium oxide (an base anhydride) reacts with water to form calcium hydroxide (a base product).

Organic anhydrides contain the carbonyl group (CO). Organic anhydrides are formed by the condensation of original acids. Lactone, an internal cyclic monoester, is an anhydride derived from the hydroxyl and carboxyl radicals. In organic chemistry, most anhydride compounds are derived from corresponding carboxylic acids. Carboxylic anhydrides, general formula (RCO)₂O, are the dehydration product of two carboxylic acid molecules. The name of carboxylic anhydride is given first from the original acid, followed by the separate word "anhydride". [CH₃(CH₂)₂CO]₂O is butanoic anhydride, CH₃COOCOCH₂CH₃ is ethanoic propanoic anhydride (or acetic propionic anhydride). Anhydrides are more reactive than the parent acids. Anhydrides are typically not target molecules, but rather they are used as

intermediates for the synthesis of other organic members such as esters and amides for the industrial applications include dyes, pharmaceuticals, pesticides, plastics, fibers, curing agents, plasticizers and many others. The reactivity of carboxylic acid derivatives are in order of acyl halides > anhydrides >> esters > acids >> amides. Anhydrides react with alcohols to form esters; acetic anhydride [(CH₃CO)₂O] reacts with ethanol (C₂H₅OH) to form ethyl acetate (CH₃COOC₂H₅) used as a common solvent. Anhydrides also react with ammonia and primary or secondary amines to form amides. Anhydrides react with water to form their corresponding acids.

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	white crystallic flakes
MELTING POINT	130 - 131 C
BOILING POINT	284 C
SPECIFIC GRAVITY	1.53
SOLUBILITY IN WATER	6 g/l (Decomposes to phthalic acid)
SOLUBILITY	soluble in alcohol, slightly soluble in ether
pH	
VAPOR DENSITY	5.1
AUTOIGNITION	570 C
NFPA RATINGS	Health: 2; Flammability: 1; Reactivity: 0
REFRACTIVE INDEX	
FLASH POINT	
STABILITY	Stable under ordinary conditions.

APPLICATIONS

Plasticizers, unsaturated polyester resins, alkyd resins, polyester polyols, dyes and pigments, halogenated anhydrides, polyetherimide resins, and isatoic anhydride.

SALES SPECIFICATION

		MOLTEN	SOLID
APPEARANCE		Clear	White flakes
PURITY(%)	L.C	Min. 99.85	Min. 99.85
COLOUR INDEX	D3366	Max. 15	Max. 20
HAZEN	D3366	Max. 25	Max. 40
MELTING POINT	D1493	Min. 130 C	Min. 130 C

TRANSPORTATION

PACKING	25kgs in bag
HAZARD CLASS	8 (Packing Group: III)
UN NO.	2214

OTHER INFORMATION

Hazard Symbols: XI, C, Risk Phrases: 34-36/37/38, Safety Phrases:

GENERAL DESCRIPTION OF PHTHALIC ACID

Phthalic Acid, also called Benzenedicarboxylic Acid with formula C₆H₄(COOH)₂, is the name of any of three isomers. The ortho form (1,2-benzenecarboxylic acid) is called simply phthalic acid. It is a white crystals decomposing at 191°C and slightly soluble in water and ether. This compound is mainly produced and marketed in the form of its anhydride produced by the oxidation of orthoxylene and naphthalene. Its wide application is based on the ortho related carboxylic acid groups as their dehydration is highly reactive with broad processing conditions to produce various downstream products. It is used to make simple esters widely used as plasticizers. It is used as in making unsaturated polyester resins, alkyd resins, polyester polyols, dyes and pigments, halogenated anhydrides, polyetherimide resins, isatoic anhydride and insect repellents. The meta form is isophthalic acid (1,3-benzenecarboxylic acid). It is a white crystals subliming at 345°C slightly soluble in water, alcohol and acetic acid

(insoluble in benzene). It is obtained by oxidizing meta-xylene with chromic acid, or by fusing potassium meta-sulphobenzoate, or meta-brombenzoate with potassium formate. IPA has excellent performance characteristics in coatings including excellent hardness, corrosion and stain resistance, hydrolytic stability of coatings and gel coats, excellent thermal stability and low resin color. It is a key ingredient in FRP markets for such products as marine, automotive, and corrosion resistant pipes and tanks. Polyesters containing isophthalic acid are also used extensively in industrial coatings applications for home appliances, automobiles, aluminum siding, and metal office furniture. It used as an intermediate for polyesters, polyurethane resins, plasticizers. The para form, known as terephthalic acid (1,4-benzenecarboxylic acid) is a combustible white powder insoluble in water, alcohol and ether; (soluble in alkalies), sublimes at 300°C. It can be produced by oxidizing caraway oil, a mixture of cymene and cuminol or by oxidizing para-diderivatives of benzene with chromic acid. TPA has been used mainly as a raw material of polyester fiber but lately it has been exploited for various uses such as non-fiber field, PET-bottle, PET-film and engineering plastics and as poultry feed additives. Phthalic acid derivatives are also widely used to make dyes, medicine, and synthetic perfumes, pesticides, and other chemical compounds.