Thirumalai Chemicals Limited

MATERIAL SAFETY DATA SHEET

SDS / MSDS

Product Name: PHTHALIC ANHYDRIDE

1. Manufacturer and Substance Identification

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Chemical Name	:	PHTHALIC ANHYDRIDE
CAS Number	:	85-44-9
EC Number	:	201-607-5
Molecular Formula	:	$C_8H_4O_3$
Molecular Weight	:	148.1
Synonyms	:	Phthalic Acid Anhydride, 1, 3-Isobenxofurandione, 1,2 Benzene Carboxylic Acid Anhydride
Identified uses	:	Used as monomer for polymer production, Laboratory chemical Formulation Mixture, refilling & loading and as an intermediate

2. Hazard Identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 & amendment EU 2018/1480 of 04th Oct 2018.

For Physico-Chemical properties	:	Not Classified
For Human health hazards		
1. Acute Toxicity oral	:	Category 4.
2. Skin corrosion / irritation	:	Category 2.
3. Serious damage / eye irritation	:	Category 1.
4. Respiration sensitization	:	Category 1
5. Skin sensitization	:	Category 1A,
6. Specific target Organ Toxicity single Exposure (STOT SE)	:	Category 3,
For Environmental hazards	:	Not Classified

2.2. Label elements: Labeling according to Regulation (EC) No 1272/2008& amendment EU 2018/1480 of 04th Oct 2018.

Hazard pictogram:

Health Hazard	Corrosion	Exclamation Mark
		

Signal word : **Danger**

Hazard statement(s):

H302 : Harmful if swallowed
H315 : Causes skin irritation
H317 : May cause an allergic skin reaction
H318 : Causes serious eye damage
H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 : May cause respiratory irritation

Precautionary statement(s):

P261 : Avoid breathing dust
P270 : Do not eat, drink or smoke when using this product
P271 : Use only outdoors or in a well-ventilated area
P272 : Contaminated work clothing should not be allowed out of the workplace
P280 : Wear protective gloves / protective clothing / eye protection / face protection
P305+P351+P338 : IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

3. Composition / Information on ingredients

Chemical Name	CAS No.	Content (W/W)	EINECS
Phthalic anhydride	85-44-9	More than 99.8 %	201-607-5
Maleic anhydride	108-31-6	Less than 0.05 %	203-571-6

4. First Aid Measures

General advice : Remove contaminated clothing. If danger of loss of consciousness, place patient in recovery position and transport accordingly. Apply artificial respiration if necessary. First aid personnel should pay attention to their own safety.

Inhalation : Remove to fresh air and keep at rest. Monitor respiratory function. If breathing is difficult, give oxygen. If necessary, give artificial respiration.

Skin Contact : Remove contaminated clothing and Shoes. Wash affected areas thoroughly with soap and water.

Eye Contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Ingestion : Rinse mouth of victim with plenty of water. Do NOT induce Vomiting Never give anything by mouth to an unconscious person.

Other : Seek Medical attention
Movement of the exposed individual from the area to fresh air is recommended. Personal protective equipment for first aid responders is recommended.

5. Fire Fighting Measures

Flash Point	:	151° C
Auto ignition	:	580° C
Lower Explosion Limit	:	1.7 % (V)
Upper explosion Limit	:	10.5 % (V)
Special Hazards	:	Combustible material. May form flammable/explosive Vapour-air mixture.
Extinguishing agents	:	Carbon dioxide (CO_2), Foam, dry powder, Sand for small fires. For larger fires use water jet or alcohol resistant foam.
Protective equipment	:	In case of fire, wear self-contained breathing apparatus with full face piece operated in positive pressure mode and chemical Protective suit.

6. Accidental Release Measures

Personal precaution	:	Avoid Inhalation. Use protective gloves, safety goggles and protective clothing. Ensure adequate ventilation. Remove ignition sources. Do not touch spilled material unless wearing protective clothing Avoid contact with skin and eye
Environmental precautions	:	Remove all sources of ignition. Prevent from entering into watercourses, sewage and confined areas
Methods for cleaning up	:	Use mechanical handling equipment. Avoid raising dust. Collect with a clean shovel, put in clean and dry vessels and cover them. Neutralize traces of residues or very little spills that remained over the soil with sodium carbonate or bicarbonate and water, or alkaline substances. Dispose of in compliance with local and national regulations.

7. Handling and Storage

Handling

General advice	:	Ensure thorough ventilation of stores and work areas. Take precautionary measures against static discharges. Keep away from sources of ignition - No smoking Avoid inhalation, contact with skin and eyes. Do not handle near Incompatible materials. Use proper personal protective equipment. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Wash hands before eating, drinks, smoking or going to the toilet. Take off all contaminated clothing and wash before reuse.
Protection against fire and explosion	:	Avoid dust formation. Dust can form an explosive mixture with air. Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy. Electrical devices must meet the specified temperature class.

Storage

General advice : Phthalic anhydride should be stored in a tightly closed packaging in a cool, dry, well-ventilated area away from sources of heat (away From direct Sunlight), Moisture and incompatible substances.

Store away from alkaline materials, oxidizers and strong acids. Copper oxide, nitric acid and sulfuric acid, sodium nitrite. Avoid static electricity discharges.

Keep in original container, in a cool dry, well-ventilated place. Keep away from food. Store locked up, keep out of reach of children.

8. Exposure Controls / Personal Protection

Engineering Controls : Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

	ACGIH	NIOSH	OSHA
Phthalic Anhydride	TWA : .012ppm (0.002mg/m3)	TWA : 1 ppm (6mg/m3)	TWA : 2 ppm (12 mg/m3)

Personal Protective Equipment and hygienic measures:

Respiratory : Full-face piece respirator for organic vapours. In cases of high potential of exposure use a supplied-air respirator, full face piece, operated in positive pressure mode

Eye : Closely fitted Safety goggles.

Hand : Use Latex or PVC gloves.

Skin and body : Overalls of single canvas with long sleeves and hood
Use safety leather shoes with rubber impermeable sole, with Protective clothing to the body

Hygiene measures : Keep away from foodstuffs.
Wash hands during break and at the end of the work

Other devices : Maintain eye wash facility in work area

9. Physical and Chemical Properties

Form : Solid White Flakes
Odour : Mild characteristic
Odour threshold : 0.053 ppm
Colour : White
pH : Hydrolyses to Phthalic acid

Melting Point/ Freezing point °C	: 131
Boiling Point° C	: 284
Relative Density gm/cm^{3}at 20° C	:1.527
Vapor Density	: 5.1
Vapor Pressure	: 0.0006 hpa
Flash Point ° C	: 152°C (closed cup); 165°C (open cup)
Evaporation Rate	: No data
Flammability	: Not Classified as Flammable
Upper/Lower Flammability Limited	: Not Applicable
Solubility in water g/L at 25° C	: 6.2
Solubility in other Solvents	: 470 g/L at 20°C
Partition Co-efficient	: 1.60
Auto ignition Temperature	: 580°C
Decomposition Temperature	: No Decomposition Reported below Boiling Point
Viscosity	: 1.19 mPas at 132°C
Explosive properties	: Not classified as Explosive
Oxidizing properties	: Not classified as Oxidizing

10. Stability and Reactivity

Stability	: Stable under normal conditions of storage and handling. Heat will contribute to instability. In molten state, it should be covered with inert gas.
Condition To Avoid	: Avoid extreme heat. Avoid moisture.
Substances to avoid	: Alkaline materials, oxidizers and strong acids. Copper oxide, nitric Acid and sulfuric acid, sodium nitrite.
Hazardous reactions	: Reacts with water. Reacts with certain metals (eg: iron). Dust explosion hazard.
Decomposition products	: Carbon dioxide and carbon monoxide.
Reactivity	: Reacts slowly with water to form Phthalic Acid

11. Toxicological Information

Acute toxicity	:	LD_{50} (oral, rats) : 1530 mg/kg
	:	LC_{50} (inhalation, rats) : >2140 mg/m^3
	:	LD_{50} (dermal, rats) : >10,000 mg/kg bw
Skin corrosion/irritation	:	Irritating
Serious eye damage/irritation	:	Irritating.
Respiratory or skin sensitisation	:	Sensitizing
Repeated dose toxicity	:	Oral NOAEL: 500 mg/kg bw/day
Germ cell mutagenicity	:	Negative
Carcinogenicity	:	Non carcinogenic
Reproductive toxicity	:	NOAEL: 1000 mg/kg bw/day

12. Ecological Information

Environmental fate and transport

Biodegradation

Test method : OECD 301C; ISO 9408; 92/69/EEC, C.4-F(aerobic), activated sludge
Method of analysis : BOD of the ThOD
Degree of elimination : 85 % (14 d)
Evaluation : Readily biodegradable (according to OECD criteria).

Aquatic Toxicity

Short-term toxicity to fish:
Brachydanio rerio (new name: Danio rerio)/fresh water/semi-static LC50 (7 days)
560 mg/L test mat

Long-term toxicity to fish :

Salmo gairdneri (new name: Oncorhynchus mykiss)fresh water/semi-static NOEC (60 d): 10 mg/L test mat.

Short-term toxicity to aquatic invertebrates

Daphnia magna/fresh water/static EC50 (48 h): >640 mg/L test mat.

Long-term toxicity to aquatic invertebrates:

Daphnia magna/freshwater NOEC (21 d): 16 mg/L test mat.

Algae and aquatic plants

Desmodesmus subspicatus (algae)/freshwater/static NOEC (72 h): >= 100 mg/L test mat.

Toxicity to sediment:

As for Phthalic anhydride the trigger value for logKow is not exceeded and a low potential for adsorption is supposed, testing on toxicity towards sediment organisms is not necessary

Toxicity to soil macro-organisms :

The results of the chemical safety assessment indicates that exposure via these pathways would not be expected to result in an unacceptable level of risk for the terrestrial compartment. Therefore, no specific testing is required for the toxicity of Phthalic anhydride to soil macro organisms.

Persistence and degradability :

Photo degradation in air

In the atmosphere a half-life of 21.4 days for Phthalic anhydride and 13 days for the hydrolysis product Phthalic acid is estimated due to indirect photolysis with hydroxyl radicals, considering an OH-concntration of 500,000 radicals/cm^3 as a 24-h average.

Photo degradation in water

In the hydrosphere, Phthalic anhydride is transformed photo chemically under anaerobic Conditions showing polymerization to polyphenyl. The half-lifes are in the range from 3.9 h to 9.6 h following first other reactions. For photo oxidation in sea water a half-life of 0.93 hours is obtained.

Hydrolysis

Phthalic anhydride hydrolyses by 50 % within 30.5 seconds in the presence of water at pH 7 and 25 C, forming Phthalic acid

Biotic degradation

Degradation rate in water : Hydrolysis - 30.5 seconds at pH 7.24 at25°C
Photolysis - 3.9 to 9.6 hours

Degradation rate in Sediment : Not relevant

Degradation rate in soil : Not relevant
Degradation rate in air : Atmospheric half-life of 21.4 d for phthalic anhydride
Atmospheric half-life of 13 d for phthalic Acid

Bioaccumulative potential

Aquatic bioaccumulation:
Calculated BCF values of 3.4 for Phthalic anhydride and 3.16 for the hydrolysis product Phthalic acid indicate no significant potential for bioaccumulation of both substances in aquatic organisms. (A logPow of 1.6 was used for calculation.)

Terrestrial bioaccumulation
In green house studies using 14C-phthalic acid as test substance bioaccumulation ratios of 0.013 for plants and 0.0046 for seeds were obtained (Dorney et al., 1985). This study demonstrates the relatively low potential for bioaccumulation of Phthalic acid in plants.

Mobility in soil:
Water:
Air
Soil and sediments
log Pow = 0,73 (Phthalic acid at 20°C)
- BCF < 100
- Readily biodegradable

Results of PBT and VpVb assessment

PBT	: Evaluation
Persistence	: not enough persistence for Classification
Bioaccumulation	: not enough bioaccumulation for Classification
Toxicity	: substance is not classified as toxic

vPvB

Very strong Persistence	: not enough strong persistence for Classification
Very strong Bioaccumulation	: not enough strong bioaccumulation for Classification
Endocrine Disruptive Properties	**: This product does not contain any known or suspected endocrine disruptors.**
Other Adverse effects	: None

13. Disposal Consideration

Disposal method:

Product	: Prior to implementing land disposal of waste residue(including waste sludge), consult local legislation for adequate disposal methods.
Contaminated packaging	: Empty containers can retain product residues and shall be disposed in accordance with the provisions proposed for the Product.

14. Transport Information

UN number : Not Applicable
UN proper shipping name : PHTHALIC ANHYDRIE
Road transport ADR/RID : Not classified
Maritime transport IMDG } : Not Classified as a dangerous good under transport regulations
Air transport ICAO/IATA : Not classified

Packaging group :
Maritime transport IMDG : Not classified
Air transport ICAO/IATA : Not classified
Environmental hazards : **None**
Special precautions for user : **None**
Maritime transport in bulk according to IMO instruments
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code. - NA

15. Regulatory Information

EPA Regulations : Reportable Quantity: 5000 Lbs

NFPA 704 Rating : Health Hazarded Rating: 3
Fire Hazardard Rating:1
Reactivity Hazardard Rating: 0

NIOSHGuidelines : TWA : 6 mg/m^3
IDLH : 60 mg/m^3
Conversion: 1 PPM = 6.06 mg/m^3@ 25°C & 1ATM

OSHA Regulations : TWA :12 mg/m^3 TWA Vacated: 6 mg/m^3

Health Risks : Irritant

Responsibility of the receiver to have the knowledge of the local and national regulations.

16. Other Information

References: Prepared in accordance with Material Safety Data Sheet- Guideline-**IS 17889-2022,** Current Extended Safety data Sheet for Phthalic Anhydride

The information provided in this Safety Data Sheet is given in good faith and is correct to the best of our knowledge and information at the date of publication. It is designed only as guidance for safe handling, storage, transportation, use and disposal. No warranty is expressed or implied.

Abbreviations and acronyms:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
OSHA: Occupational Safety & Health Administration
vPvB very Persistent, very Bio accumulative

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