

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.2
Creation Date: July 15, 2019
Revision Date: August 08, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Phthalic Anhydride

1.2 Other means of identification

Product number CWLT600502

Other names 1,3-DIHYDRO-IMIDAZOL-2-ONE; 4-imidazolin-2-one; 1H-imidazol-2(3H)-one

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.

Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.

Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou

Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175

Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Category 4, Oral

Skin irritation, Category 2

Serious eye damage, Category 1

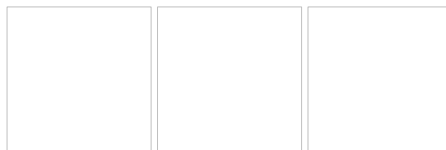
Skin sensitization, Category 1

Specific target organ toxicity – single exposure, Category 3

Respiratory sensitization, Category 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H302 Harmful if swallowed

H315 Causes skin irritation

H318 Causes serious eye damage

H317 May cause an allergic skin reaction

H335 May cause respiratory irritation

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

Precautionary statement(s)

Prevention

P264 Wash ... thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P272 Contaminated work clothing should not be allowed out of the workplace.

P271 Use only outdoors or in a well-ventilated area.

P284 [In case of inadequate ventilation] wear respiratory protection.

Response	P301+P317 IF SWALLOWED: Get medical help. P330 Rinse mouth. P302+P352 IF ON SKIN: Wash with plenty of water/... P321 Specific treatment (see ... on this label). P332+P317 If skin irritation occurs: Get medical help. P362+P364 Take off contaminated clothing and wash it before reuse. P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P317 Get medical help. P333+P317 If skin irritation or rash occurs: Get medical help. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P319 Get medical help if you feel unwell. P342+P316 If experiencing respiratory symptoms: Get emergency medical help immediately.
Storage	P403+P233 Store in a well-ventilated place. Keep container tightly closed. P405 Store locked up.
Disposal	P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Phthalic Anhydride	Phthalic anhydride	85-44-9	201-607-5	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

Solid irritates skin and eyes, causing coughing and sneezing. Liquid causes severe thermal burns. (USCG, 1999)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

First aid: Inhalation - Fresh air, rest. Half-upright position. Refer for medical attention. Skin - Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Eyes - First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. Ingestion - Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Specific hazards arising from the chemical

Excerpt from ERG Guide 156 [Substances - Toxic and/or Corrosive (Combustible / Water-Sensitive)]: Combustible material: may burn but does not ignite readily. Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff. When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapors may travel to source of ignition and flash back. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated or if contaminated with water. (ERG, 2016)

5.3 Special protective actions for fire-fighters

Use water spray, foam, dry powder, carbon dioxide.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: chemical protection suit including self-contained breathing apparatus. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Personal protection: chemical protection suit including self-contained breathing apparatus. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames. Closed system, dust explosion-proof electrical equipment and lighting. Prevent deposition of dust. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Separated from combustible substances, reducing agents, strong oxidants, strong bases, strong acids and food and feedstuffs. See Chemical Dangers. Ventilation along the floor. Dry. Well closed. Chemical stability: Stable under recommended storage conditions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.002 mg/m³, as TWA; 0.005 mg/m³ as STEL; (skin); (SEN); A4 (not classifiable as a human carcinogen). MAK: sensitization of respiratory tract (SA)

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear safety goggles or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Solid. Crystalline.
Colour	Colourless.
Odour	Mild
Melting point/freezing point	131.6 °C.
Boiling point or initial boiling point and boiling range	284.5 °C. Atm. press.: 1 013 hPa.
Flammability	Combustible Solid
Lower and upper explosion limit/flammability limit	Lower flammable limit: 1.7% by volume; Upper flammable limit: 10.5% by volume
Flash point	152 °C.
Auto-ignition temperature	580 °C.
Decomposition temperature	no data available
pH	no data available

Kinematic viscosity	dynamic viscosity (in mPa s) = 1.125. Temperature: 155.0 °C. Remarks: Reference: Beilstein, 2003.; dynamic viscosity (in mPa s) = 0.875. Temperature: 180.0 °C. Remarks: Reference: Beilstein, 2003.; dynamic viscosity (in mPa s) = 1.19. Temperature: 132.0 °C. Remarks: Reference: Kirk-Othmer, 2008.
Solubility	6.4 g / L (20 °C)
Partition coefficient n-octanol/water	log Pow = 1.6.
Vapour pressure	0.001 hPa. Temperature: 26.6 °C.
Density and/or relative density	1.53 g/cm ³ . Temperature: 20 °C.
Relative vapour density	5.1 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on contact with hot water. This produces phthalic acid. Reacts with strong oxidants, strong acids, strong bases and reducing agents. Reacts violently with copper oxide and sodium nitrite on heating. This generates explosion hazard. Attacks many metals in the presence of water.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

Combustible solid Dust explosion possible if in powder or granular form, mixed with air. PHTHALIC ANHYDRIDE reacts exothermically with water. The reactions are sometimes slow, but can become violent when local heating accelerates their rate. Acids accelerate the reaction with water. Incompatible with acids, strong oxidizing agents, alcohols, amines, and bases. Undergoes exothermic nitration with fuming nitric acid-sulfuric acid and may give mixtures of the potentially explosive phthaloyl nitrates or nitrites or their nitro derivatives [Chem. & Ind. 20:790. 1972]. Phthalic anhydride reacts violently with CuO at elevated temperatures [Park, Chang-Man, Richard J. Sheehan. "Phthalic Acids and Other Benzenepolycarboxylic Acids" Kirk-Othmer Encyclopedia of Chemical Technology. John Wiley & Sons, Inc. 2005]. Mixtures of phthalic anhydride and anhydrous CO₂ explode violently if heated [Leaflet No. 5, Inst. of Chem., London, 1940].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong oxidizers, water [Note: Converted to phthalic acid in hot water].

10.6 Hazardous decomposition products

Phthalic anhydride hydrolyzes rapidly in the presence of water forming phthalic acid. Half-life for phthalic anhydride was 30.5 seconds at pH 7.24. At pH 6.8 the half-life of phthalic anhydride in water was prolonged to 61 seconds.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 - rat (male) - 1 530 mg/kg bw.
- Inhalation: LC50 - rat (male/female) - > 2.14 mg/L air (analytical).
- Dermal: LD50 - rabbit - > 10 000 mg/kg bw.

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

A4; Not classifiable as a human carcinogen.

Reproductive toxicity

No studies regarding reproductive or developmental effects in humans were available. Phthalic anhydride was reported to be teratogenic in mice following intraperitoneal injection. Decreased spermatozoa motility time was reported in one study in which male rats were exposed via inhalation.

STOT-single exposure

The substance is severely irritating to the eyes, skin and respiratory tract.

STOT-repeated exposure

Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation may cause asthma. See Notes.

Aspiration hazard

A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 - Danio rerio (previous name: Brachydanio rerio) - 560 mg/L - 7 d.
- Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna - > 640 mg/L - 48 h.
- Toxicity to algae: EC0 - Desmodesmus subspicatus (previous name: Scenedesmus subspicatus) - >= 100 mg/L - 72 h.
- Toxicity to microorganisms: EC50 - activated sludge - > 1 000 mg/L - 3 h. Remarks:Respiration rate.

12.2 Persistence and degradability

AEROBIC: Based on the available experimental biodegradation test results, phthalic anhydride can be classified as readily biodegradable(1). However, phthalic anhydride hydrolyzes rapidly in water with a half-life of about 25 minutes or less at 25 deg C(1,2), and biodegradation test results may be reflective of biodegradation of phthalic acid which is the hydrolysis product of phthalic anhydride(1,2). Phthalic anhydride, present at 100 mg/L, reached 85.2% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(3); it was noted that the phthalic anhydride had been hydrolyzed to phthalic acid(3). Using OECD Method 301D (closed bottle test) and a domestic sewage inoculum, phthalic anhydride reached 71% of theoretical BOD after 30 days(1). Phthalic anhydride was reported to have a 5 day theoretical oxygen demand of 73.46% using 0.5 ppm concentration with a sewage inoculum(4). Theoretical BOD was reported to be 44-78% as a result of incubation of 1-4 ppm with sewage inoculum(5). Reported degradation of an initial concentration of 2 ppm phthalic anhydride was approximately 22% after incubation with sewage (standard dilution method) and 18% (seawater dilution method) for 5 days(6). Mineralization of 33% of an initial concentration of 9 ppm phthalic anhydride incubated with activated sludge for 24 hrs was reported based on chemical oxygen demand(7). Phthalic anhydride degradation using an acclimated activated sludge gave a 33% chemical oxygen demand and 88% total organic carbon in 24 hours(8).

12.3 Bioaccumulative potential

An estimated BCF of 5 was calculated in fish for phthalic anhydride(SRC), using a log Kow of 1.60(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC). Phthalic anhydride did not bioconcentrate in Gambusia (mosquito fish)(4). Phthalic anhydride has a reported BCF of 4,053 in Oedogonium (alga) but did not bioconcentrate in Daphnia (water flea) or Physa (snail)(4). Phthalic anhydride hydrolyzes rapidly in water with a half-life of about 25 minutes or less at 25 deg C(1,5) which suggests that bioconcentration in fish may not be an important fate process(SRC).

12.4 Mobility in soil

Using a structure estimation method based on molecular connectivity indices(1), the Koc of phthalic anhydride can be estimated to be 10(SRC). According to a classification scheme(2), this estimated Koc value suggests that phthalic anhydride is expected to have very high mobility in soil. Phthalic anhydride hydrolyzes rapidly in water with a half-life of about 25 minutes or less at 25 deg C(3,4) which suggests that leaching may not be an important fate process(SRC).

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN3256 (For reference only, please check.)	IMDG: UN3256 (For reference only, please check.)	IATA: UN3256 (For reference only, please check.)
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14.2 UN Proper Shipping Name

ADR/RID: ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash point above 60 °C, at or above its flash point (For reference only, please check.)	IMDG: ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash point above 60 °C, at or above its flash point (For reference only, please check.)	IATA: ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash point above 60 °C, at or above its flash point (For reference only, please check.)
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14.3 Transport hazard class(es)

ADR/RID: 3 (For reference only, please check.) IMDG: 3 (For reference only, please check.) IATA: 3 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: III (For reference only, please check.)

IMDG: III (For reference only, please check.)

IATA: III (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Phthalic anhydride	Phthalic anhydride	85-44-9	201-607-5
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019
Revision Date August 08, 2025

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Other Information

The substance may be transported in molten state. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance. For materials containing more than 0.05% of maleic anhydride the UN number is 2214, hazard class 8, packaging group III. Do NOT take working clothes home.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate

safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.