

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.1
Creation Date: July 15, 2019
Revision Date: May 01, 2024

SECTION 1: Identification

1.1 GHS Product identifier

Product name 1,4-Dinitrobenzene

1.2 Other means of identification

Product number CCEM500073

Other names 9,10-Anthracenedione,1,4-dinitro; 1,4-Dinitrobenzene; p-dinitrobenzene

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 2, Oral

Acute toxicity - Category 1, Dermal

Acute toxicity - Category 2, Inhalation

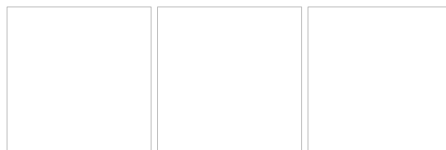
Specific target organ toxicity – repeated exposure, Category 2

Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H300 Fatal if swallowed

H310 Fatal in contact with skin

H330 Fatal if inhaled

H373 May cause damage to organs through prolonged or repeated exposure

H410 Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P264 Wash ... thoroughly after handling.

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

P262 Do not get in eyes, on skin, or on clothing.

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

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

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

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

P273 Avoid release to the environment.

Response	P301+P316 IF SWALLOWED: Get emergency medical help immediately. P321 Specific treatment (see ... on this label). P330 Rinse mouth. P302+P352 IF ON SKIN: Wash with plenty of water/... P316 Get emergency medical help immediately. P361+P364 Take off immediately all contaminated clothing and wash it before reuse. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P320 Specific treatment is urgent (see ... on this label). P319 Get medical help if you feel unwell. P391 Collect spillage.
Storage	P405 Store locked up. P403+P233 Store in a well-ventilated place. Keep container tightly closed.
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
1,4-Dinitrobenzene	1,4-dinitrobenzene	100-25-4	202-833-7	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Artificial respiration may be needed. 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. Give a slurry of activated charcoal in water to drink. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

INHALATION OR INGESTION: Headache, vertigo, nausea, vomiting, diarrhea, fever, rapid weak pulse, decreased blood pressure, cyanosis, exhaustion, hepatomegaly, jaundice, albuminuria, hematuria, visual scotomata, amblyopia and nystagmus. EYES: Irritation. SKIN: Stains skin yellow; if skin contact is prolonged, can be absorbed into blood causing same symptoms as for inhalation. (USCG, 1999)

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

Basic treatment: Establish a patent airway. Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for shock and treat if necessary . Anticipate seizures and treat if necessary . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport . Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal . Aniline and related compounds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

For rescue purposes wear full protective clothing. Fight fire from an explosion-resistant location. In advanced or massive fires, area should be evacuated. If fire occurs in vicinity of this material water should be used to keep containers cool. 1,2-Dinitrobenzene

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: When heated to decomposition toxic fumes of oxides of nitrogen released. Behavior in Fire: Decomposes explosively. Can be detonated by shock or heat under confinement that will permit high pressure buildup (USCG, 1999)

5.3 Special protective actions for fire-fighters

Use water spray, foam, powder, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Consult an expert! 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. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.

6.2 Environmental precautions

Consult an expert! 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. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.

6.3 Methods and materials for containment and cleaning up

1. Remove all ignition sources. 2. Ventilate area of spill. 3. For small quantities, sweep onto paper or other suitable material and burn in suitable combustion chamber which allows burning in unconfined condition and is equipped with appropriate effluent gas cleaning device. Large quantities may be reclaimed; however, if this is not practical, dissolve in fuel oil and atomize in suitable combustion chamber equipped with cleaning an appropriate effluent gas cleaning device.

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 strong oxidants, strong bases, strong acids and food and feedstuffs. See Chemical Dangers.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.15 ppm as TWA; (skin); BEI issued. MAK: skin absorption (H); carcinogen category: 3B

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 face shield 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	P-dinitrobenzene is a colorless to yellow solid. Sinks and mixes slowly with water. (USCG, 1999)
Colour	White crystals
Odour	no data available
Melting point/freezing point	495°C(lit.)
Boiling point or initial boiling point and boiling range	160°C/10mmHg(lit.)
Flammability	Combustible Solid
Lower and upper explosion limit/flammability limit	no data available
Flash point	96°C(lit.)
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available

Solubility	0.01 % (NIOSH, 2016)
Partition coefficient n-octanol/water	log Kow= 1.46
Vapour pressure	0.00206mmHg at 25°C
Density and/or relative density	1.486g/cm ³
Relative vapour density	5.8 (air= 1 at boiling point of dinitrobenzene) /Dinitrobenzene, all isomers/
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

On combustion, forms toxic gases and fumes including nitrogen oxides. Reacts violently with strong oxidants, strong bases and metals (tin and zinc). This generates fire and explosion hazard. Mixtures with nitric acid are highly explosive.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

Dust explosion possible if in powder or granular form, mixed with air. All three isomers have similar properties and may react vigorously with oxidizing materials. Their reaction with nitric acid (nitration) will lead to a mixture of trinitrobenzenes possessing high-explosive properties [Urbanski, 1967, vol. 3, p. 290]. If heat and reaction conditions of the nitration are not controlled, detonation comparable to TNT may occur [Anon., J. R. Inst. Chem., 1960, 84, p. 451]. Mixture of 1,3-dinitrobenzene with tetranitromethane was found highly explosive [Urbanski, 1964, vol. 1, 592]. 1,2-dinitrobenzene is a severe explosion hazard when shocked or exposed to heat or flame. When heated to decomposition all dinitrobenzenes emit toxic fumes of nitrogen oxides [Sax, 9th ed., 1996, p. 1374].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Contact with strong oxidizers may cause fires & explosions. Contact with caustics & metals such as tin & zinc may cause evolution of heat & incr in pressure.

10.6 Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /nitrogen oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

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

no data available

Reproductive toxicity

no data available

STOT-single exposure

The substance is irritating to the eyes and respiratory tract. The substance may cause effects on the blood. This may result in the formation of methaemoglobin. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

The substance may have effects on the blood. This may result in anaemia. The substance may have effects on the liver. This may result in liver impairment.

Aspiration hazard

No indication can be given about the rate at which a harmful concentration of this substance in the air is reached on evaporation at 20°C.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 Pimephales promelas (fathead minnow) 0.687 (0.642-0.734) mg/l 24 hr, wt 164 mg, flow-through bioassay, dissolved oxygen 7.4 (4.6-8.8) mg/l, water hardness 44.9 (42.4-46.6) mg/l as CaCO₃, pH 6.9-7.7, alkalinity 42.9 (39.6-61.4) mg/l CaCO₃, temp: 26.4 +/- 1.4 deg C, Purity 98%
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

More than 64 days were required to achieve a total loss of 1,4-dinitrobenzene when incubated with Niagara silt loam inoculum at 25 deg C(1). No additional data were available concerning 1,4-dinitrobenzene, but 1,2-dinitrobenzene and 1,3-dinitrobenzene are degraded to aromatic amines and ring opened species upon anaerobic and aerobic incubation, respectively, with sewage effluent(2). Dinitrobenzene (isomer not specified), present at 100 mg/l, reached 0 percent of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/l and the Japanese MITI test(3), suggesting biodegradation occurs slowly(SRC).

12.3 Bioaccumulative potential

A BCF value of 5 was measured for 1,4-dinitrobenzene in fish(1). BCF values of 2-38 were measured in carp exposed to dinitrobenzene (isomer not specified) over a 6 week incubation period(2). According to a classification scheme(3), this BCF value suggest bioconcentration in aquatic organisms is low to moderate(SRC).

12.4 Mobility in soil

The Koc of 1,4-dinitrobenzene is estimated as 150(SRC), using a measured log Kow of 1.46(1) and a regression-derived equation(2). According to a classification scheme(3), this estimated Koc value suggests that 1,4-dinitrobenzene is expected to have high mobility in soil. It has been shown that nitrophenols and nitrobenzenes adsorb strongly to clay through an interaction between the nitro group and the water molecules or metallic cations in the clay(4), and 1,4-dinitrobenzene is expected to similarly bind to clays(SRC). The adsorption of 1,4-dinitrobenzene was studied in monmorillonite, kaolinite and illite clays(5). Adsorption coefficients (Kd) of 188, 1,460 and 3,100 L/kg were measured in kaolinite, illite and monmorillonite, respectively(5).

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: UN3443 (For reference only, please check.) IMDG: UN3443 (For reference only, please check.) IATA: UN3443 (For reference only, please check.)

14.2 UN Proper Shipping Name

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

14.3 Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.) IMDG: 6.1 (For reference only, please check.) IATA: 6.1 (For reference only, please check.)

14.4 Packing group, if applicable

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

14.5 Environmental hazards

ADR/RID: Yes IMDG: Yes IATA: Yes

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
1,4-dinitrobenzene	1,4-dinitrobenzene	100-25-4	202-833-7
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 May 01, 2024

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

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. See ICSCs 0460, 0691 and 0725. NFPA Code: H3; F1; R4; for 1,2-Dinitrobenzene.

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

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