Chemical Safety Data Sheet MSDS / SDS

2,4-dinitrophenol SDS

Revision Date:2024-04-25 Revision Number:1

Section 1 Section 2 Section 3 Section 4 Section 5 Section 6 Section 7 Section 8
Section 9 Section 10 Section 11 Section 12 Section 13 Section 14 Section 15 Section 16

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: 2,4-dinitrophenol

CAS: 51-28-5

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.

Uses advised against: none

Company Identification

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

Telephone: +91 9550333722

SECTION 2: Hazards identification

Classification of the substance or mixture

Acute toxicity - Category 3, Oral
Acute toxicity - Category 3, Dermal

Acute toxicity - Category 3, Inhalation
Specific target organ toxicity – repeated exposure, Category 2
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed
H311 Toxic in contact with skin
H331 Toxic if inhaled
H373 May cause damage to organs through prolonged or repeated exposure
H400 Very toxic to aquatic life

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.
P271 Use only outdoors or in a well-ventilated area.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
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.
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.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	2,4-dinitrophenol
Common names and synonyms:	2,4-dinitrophenol
CAS number:	51-28-5
EC number:	200-087-7
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer immediately 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

Rest. Refer immediately for medical attention. See Notes.

Most important symptoms/effects, acute and delayed

Dust: poisonous if inhaled or if skin is exposed. solid: poisonous if swallowed. (uscg, 1999)

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

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Dinitrophenol and Related Compounds

SECTION 5: Firefighting measures

Suitable extinguishing media

If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use foam, dry chemical, or carbon dioxide. Dinitrophenol solutions

Specific hazards arising from the chemical

Combustible. May explode if subjected to heat or flame. POISONOUS GAS IS PRODUCED WHEN HEATED. Vapors are toxic. Can detonate or explode when heated under confinement. (USCG, 1999)

Special protective actions for fire-fighters

Use water in large amounts. In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do not allow to dry out. Do NOT let this chemical enter the environment. Sweep spilled substance into containers.

Carefully collect remainder. Store and dispose of according to local regulations.

Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do not allow to dry out. Do NOT let this chemical enter the environment. Sweep spilled substance into containers. Carefully collect remainder. Store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete. Remove all ignition sources. Wet spilled material with water. Collect powdered material in the most convenient and safe manner and deposit in sealed containers. Ventilate area after clean-up is complete. It may be necessary to contain and dispose of this chemical as a hazardous waste. Keep dinitrophenol out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations. If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated waters. Contact your Department of Environmental Protection of your regional office of the federal EPA for specific recommendations.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. Do NOT expose to friction or shock. Use non-sparking handtools. Prevent deposition of dust. Closed system, dust explosion-proof electrical equipment and lighting. 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.

Conditions for safe storage, including any incompatibilities

Fireproof. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing. Cool. Separated from combustible substances, reducing agents and food and feedstuffs./Dinitrophenol/ ... should be stored in a cool ventilated place away from area of acute fire hazard and away from powerful oxidizing agents. Dinitrophenol

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

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.

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

Eye/face protection

Wear safety goggles.

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. Platelets or leaflets, crystals.
Colour:	Yellow.
Odour:	SWEET, MUSTY ODOR
Melting point/freezing point:	>= 112 - <= 114 °C.
Boiling point or initial boiling point and boiling range:	312.1°C at 760 mmHg

Flammability:	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit/flammability limit:	no data available
Flash point:	142.8°C
Auto-ignition temperature:	no data available
Decomposition temperature:	no data available
pH:	pH range: 2.6 Colorless, 4.4 Yellow
Kinematic viscosity:	no data available
Solubility:	>27.6 [ug/mL]
Partition coefficient n-octanol/water:	log Pow = 1.54. Remarks:No further information available.
Vapour pressure:	1.49 mm Hg. Temperature:18 °C.
Density and/or relative density:	1.683 g/cm3. Temperature:24 °C.
Relative vapour density:	6.35 (vs air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

May decompose explosively on shock, friction or concussion. May explode on heating. Mixtures with alkalis, ammonia and most metals are shock-sensitive. Decomposes on heating. This produces toxic gases including nitrogen oxides. See Notes.

Chemical stability

Appear to be stable in acid solution, but are susceptible to decomposition by UV radiation in alkaline solutions. Dintrophenols

Possibility of hazardous reactions

The flammability of the solution depends on the nature of the solvent. Dintrophenol is combustible though it may require some effort to ignite. /Dinitrophenol solutions/Dust explosion possible if in powder or granular form, mixed with air.2,4-DINITROPHENOL may explode if subjected to heat or flame. May explode if allowed to dry out. Forms explosive salts with alkalis and ammonia. Incompatible with heavy metals and their compounds. Also incompatible with strong oxidizing agents, strong bases and reducing agents. Reacts with combustibles. (NTP, 1992)

Conditions to avoid

no data available

Incompatible materials

Contact with reducing agents, combustibles may cause fire and explosions. Forms shock-sensitive explosive salts with ammonia, strong bases, and most metals. May accumulate static electrical charges /which/ may cause ignition of its vapors.

Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /nitroxides/.

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 - rat - 30 mg/kg.

Inhalation: LCLo - dog - 300 mg/m^3.

Dermal: LD0 - guinea pig - ca. 100 - 200 mg/kg.

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

Case reports of women taking 2,4-dinitrophenol orally for weight loss suggest that it may affect the female reproductive system, but the limited information is inconclusive. One study reported an increased incidence of stillborn animals and increased pup mortality in the offspring of animals exposed to 2,4-dintrophenol by gavage.

STOT-single exposure

The substance may be irritating to the eyes and skin.

STOT-repeated exposure

Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the metabolism. This may result in cataract, cardiovascular disorders and nervous system impairment.

Aspiration hazard

A nuisance-causing concentration of airborne particles can be reached quickly when dispersed.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50 - several types standard (OECD) fresh water fish - 390 µg/L - 96 h.

Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna - 4 390 µg/L - 48 h.

Toxicity to algae: EC50 - several types of green algae - 10 900 µg/L - 96 h.

Toxicity to microorganisms: NOEC - activated sludge respiring on syntetic sewage - 4 ppm - 6.5 h.

Persistence and degradability

AEROBIC: 2,4-Dinitrophenol, present at 100 mg/L, reached 0% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(1). It is reported that nitrophenols can inhibit aerobic microbial growth by uncoupling the metabolic process of oxidative phosphorylation(2). Static incubation of 5 and 10 mg/L of 2,4-dinitrophenol seeded with settled domestic wastewater resulted in 60 and 68% degradation, respectively, in 7 days(3). Oxygen uptake by mixed cultures of phenol adapted microorganisms suggests that 2,4-dinitrophenol was slowly degraded under aerobic conditions(4-5). Possible biotransformation processes of 2,4-dinitrophenol are: reduction of the nitro group, hydroxylation of the aromatic ring and displacement of the nitro group by a hydroxy group(6). A pure culture of the fungus Fusarium oxysporum was found to reduce 2,4-dinitrophenol to 2-amino-4-nitrophenol and 4-amino-2-nitrophenol(6). Nitrite release has been observed during the metabolism of 2,4-dinitrophenol by pure cultures of Nocardia alba, Arthrobacter and Corynebacterium simplex(6). The biodegradation half-life of 2,4-dinitrophenol in an acidic soil was reported as 32.1 days and the biodegradation half-life in a basic soil was reported as 4.6 days(7). The half-life for 2,4-dinitrophenol was measured in field studies to be 3-263 days at an application rate of 1.5 kg/ha, however degradation was not specified as abiotic or biodegradation(8).

Bioaccumulative potential

BCF values of <0.4-0.7 and <3.7 were measured in carp (Cyprinus carpio) exposed over a 6 week incubation period at 2,4-dinitrophenol concentrations of 50 and 5 ug/L, respectively(1). According to a classification scheme(2), these BCFs suggest the potential for bioconcentration in aquatic organisms is low(SRC).

Mobility in soil

2,4-Dinitrophenol has a measured Koc of 13.5 in alluvial sandy loam (7.8% clay, 30% silt, 62.2% sand, 1.1% organic matter, pH 8.1)(1). 2,4-Dinitrophenol also has a measured Koc of 16.6(2). According to a classification scheme(3), these Koc values suggest that 2,4-dinitrophenol is expected to have very high mobility in soil. The pKa of 2,4-dinitrophenol is 4.09(4), indicating that this compound will exist almost entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(5). This can be seen in the measured Koc values(SRC).

Other adverse effects

no data available

SECTION 13: Disposal considerations

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

UN Number

ADR/RID: UN0076 (For reference only, please check.)
IMDG: UN0076 (For reference only, please check.)
IATA: UN0076 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: DINITROPHENOL, dry or wetted with less than 15% water, by mass? (For reference only, please check.)
IMDG: DINITROPHENOL, dry or wetted with less than 15% water, by mass? (For reference only, please check.)
IATA: DINITROPHENOL, dry or wetted with less than 15% water, by mass? (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 1.1D (For reference only, please check.)
IMDG: 1.1D (For reference only, please check.)
IATA: 1.1D (For reference only, please check.)

Packing group, if applicable

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

Environmental hazards

ADR/RID: Yes
IMDG: Yes

IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

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.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

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 all available methods for reducing body temperature.Because of its explosive properties, the compound is used in the form of a water paste.UN 0076 applies to the dry compound or wetted with less than 15% water (Hazard class 1, Subsidiary Risks 6.1). UN 1320 applies to compound wetted with no less than 15% waterCAS 25550-58-7 applies to unspecified isomers of dinitrophenol.