

Chemical Safety Data Sheet MSDS / SDS

Nitrobenzene SDS

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

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

Product name: Nitrobenzene

CAS: 98-95-3

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

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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
Carcinogenicity, Category 2
Specific target organ toxicity - repeated exposure, Category 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 3
Reproductive toxicity, Category 1B

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
H351 Suspected of causing cancer
H372 Causes damage to organs through prolonged or repeated exposure
H412 Harmful 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.
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.
P203 Obtain, read and follow all safety instructions before use.
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.
P318 IF exposed or concerned, get medical advice.
P319 Get medical help if you feel unwell.

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: | Nitrobenzene |
| Common names and synonyms: | Nitrobenzene |
| CAS number: | 98-95-3 |
| EC number: | 202-716-0 |
| Concentration: | 100% |

SECTION 4: First aid measures

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. Rest. Refer for medical attention .

Most important symptoms/effects, acute and delayed

Can cause death due to respiratory failure. Classified as extremely toxic. The mean lethal oral dose is probably between 1 and 5 grams. Systemic effects may be delayed for a few hours. This compound is rapidly absorbed through the skin. It is a powerful methemoglobin former. Ethyl alcohol aggravates intoxication caused by nitrobenzene exposure. (EPA, 1998)

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

In rare cases of accidental poisoning by nitrobenzene treatment applied incl 3 exchange transfusions, 5 hyperbaric oxygen therapy sessions, which resulted in cure on 24th day.

SECTION 5: Firefighting measures

Suitable extinguishing media

Water, foam, carbon dioxide, or dry chemical

Specific hazards arising from the chemical

Moderate explosion hazard when exposed to heat or flame. Reacts violently with nitric acid, aluminum trichloride plus phenol, aniline plus glycerine, silver perchlorate and nitrogen tetroxide. Avoid aluminum trichloride; aniline; glycerol; sulfuric acid; oxidants; phosphorus pentachloride; potassium; potassium hydroxide. Avoid sunlight, physical damage to container, freezing, and intense heat. (EPA, 1998)

Special protective actions for fire-fighters

Use water spray, alcohol-resistant foam, dry powder, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Environmental precautions

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the chemical in this fashion, it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames. Above 88°C use a closed system and ventilation. 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

Separated from combustible substances, reducing agents, strong oxidants, strong acids and food and feedstuffs. Store in an area without drain or sewer access. Store in a cool, dry, well-ventilated, dark location. Separate from acids, bases, oxidizing materials, and metals.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 1 ppm as TWA; (skin); A3 (confirmed animal carcinogen with unknown relevance to humans). MAK: 0.51 mg/m³, 0.1 ppm; peak limitation category: II(4); skin absorption (H); carcinogen category: 4; pregnancy risk group: C. EU-OEL: 1 mg/m³, 0.2 ppm as TWA; (skin)

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 ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:

Nitrobenzene is a pale yellow to dark brown liquid. Flash point 190°F. Very slightly soluble in water. Toxic by inhalation and by skin absorption. Combustion give toxic oxides of nitrogen. Density 10.0 lb /gal.

Colour:

Greenish-yellow crystals or yellow, oily liquid

| | |
|---|---|
| Odour: | Odor of volatile oil almond |
| Melting point/freezing point: | 41765°C |
| Boiling point or initial boiling point and boiling range: | 210-211°C(lit.) |
| Flammability: | Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. |
| Lower and upper explosion limit/flammability limit: | Lower flammable limit: 1.8% by volume at 200 def F (93 deg C) |
| Flash point: | 88°C |
| Auto-ignition temperature: | 899°F |
| Decomposition temperature: | no data available |
| pH: | no data available |
| Kinematic viscosity: | 1.863 mPa-s at 25 deg C |
| Solubility: | Insoluble (<1 mg/ml at 75° F) (NTP, 1992) |
| Partition coefficient n-octanol/water: | log Kow = 1.85 |
| Vapour pressure: | 0.15 mm Hg (20 °C) |
| Density and/or relative density: | 1.196g/mL at 25°C(lit.) |
| Relative vapour density: | 4.2 (vs air) |
| Particle characteristics: | no data available |

SECTION 10: Stability and reactivity

Reactivity

On combustion, forms toxic and corrosive fumes including nitrogen oxides. Reacts violently with strong oxidants and reducing agents. This generates fire and explosion hazard. Reacts violently with strong acids and nitrogen oxides. This generates explosion hazard.

Chemical stability

no data available

Possibility of hazardous reactions

Fire hazard is/ moderate when exposed to heat, flame, or oxidizers. Aluminum chloride added to NITROBENZENE containing about 5% phenol caused a violent explosion [Chem. Eng. News 31:4915. 1953]. Heating a mixture of nitrobenzene, flake sodium hydroxide and a little water led to an explosion, discussed in [Bretherick's 5th ed. 1995]. Mixed with oxidants, i.e. dinitrogen tetroxide, fluorodinitromethane, nitric acid, peroxodisulfuric acid, sodium chlorate, tetranitromethane, uranium perchlorate, etc., forms highly sensitive explosive, [Bretherick 5th ed, 1995]. Heated mixtures of nitrobenzene and tin(IV) chloride produce exothermic decomposition with gas production [Bretherick, 5th Ed., 1995].

Conditions to avoid

no data available

Incompatible materials

Explosive reaction with solid or concentrated alkali + heat (eg, sodium hydroxide or potassium hydroxide), aluminum chloride + phenol (at 120 deg C), aniline + glycerol + sulfuric acid, nitric + sulfuric acid + heat.

Hazardous decomposition products

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

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 Rat oral 600 mg/kg

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

NTP: Reasonably anticipated to be a human carcinogen

Reproductive toxicity

No information is available on the reproductive or developmental effects of nitrobenzene in humans. Developmental effects, such as birth defects or embryotoxic effects, have not been reported in animal studies with inhalation exposure to nitrobenzene. However, reproductive effects, including a decrease in fertility, reduced testicular weights, and decreased sperm production have been noted in inhalation and oral animal studies.

STOT-single exposure

The substance may cause effects on the blood. This may result in the formation of methaemoglobin. Exposure could cause lowering of consciousness. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

The substance may have effects on the blood, spleen and liver. This substance is possibly carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

Aspiration hazard

A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50; Species: *Brachydanio rerio* (Zebra fish); Concentration: 113 mg/L for 4 days; Conditions: pH 7.5

Toxicity to daphnia and other aquatic invertebrates: EC50; Species: *Daphnia magna* (Water flea, age <24 hr); Conditions: freshwater, static, 20 deg C, pH 8.2, hardness 130 mg/L CaCO₃; Concentration: 11500 ug/L for 24 hr (95% confidence interval: 8800-15000 ug/L); Effect: intoxication, immobilization

Toxicity to algae: EC50; Species: *Pseudokirchneriella subcapitata* (Green algae, age 3-7 days); Conditions: freshwater, static, 24 deg C, pH 7.3-9.77; Concentration: 20790 ug/L for 96 hr (95% confidence interval: 3450-38130 ug/L); Effect: decreased population biomass

Toxicity to microorganisms: no data available

Persistence and degradability

Nitrobenzene was degraded by activated sludge in municipal wastewater at concn of 400-600 g/cu m. activated sludge adapted to degradation of high pyridine concn is also able to decompose nitrobenzene.

Bioaccumulative potential

The BCF of nitrobenzene in golden orfe (*Leuciscus idus melanotus*) was <10 in a 3 day static test(1). In a 28 day flow through test using fathead minnows, the BCF was 15(2). Another investigator obtained a BCF of 6 in fish (*Poecilia reticulata*)(3) and the bioconcentration test of the Japanese Ministry of International Trade and Industry report a BCF of <10(4). A BCF of 3.31 was also reported in unspecified fish(5). No biomagnification of nitrobenzene was observed in an aquatic ecosystem containing algae, *daphnia magna*, mosquito larvae, snails, and mosquito fish(6). BCF values of 3.1-4.8 and 1.6-7.7 were measured in carp (*Cyprinus carpio*) at concentrations of 0.125 and 0.0125 mg/L nitrobenzene, respectively, in a 6 week flow through test(7). In a 3 day static test using guppies, a BCF value of 2.4 was measured(8). Nitrobenzene had an uptake efficiency (defined as the ratio of the flux of chemical into the fish to the flux of chemical into the gill compartment) of 0.26 in rainbow trout(9). Nitrobenzene had a lipid based BCF of 28.32 in carp(10). A BCF of 1.47 was determined for goldfish (*Carassius auratus*)(11). In green algae (*Chlorella fusca*), a BCF of 24 was obtained(1). According to a classification scheme(12), these BCFs suggest bioconcentration in aquatic organisms is low(SRC).

Mobility in soil

The leachability of nitrobenzene was studied in three typical Norwegian soils, one which was sandy with a low organic content, and two organic soils(1). The resulting Koc and retardation factor for the sandy soil were 30.6 and 1.27, while for the two organic soils the Koc values were 42.8 and 69.6 and the retardation factors 3.36 and 5.52(1). Koc values for two Danish subsoils were 170 and 370(2). When a mixture of pollutants, including nitrobenzene, in spring water was added to a column of Lincoln fine sand over a 45 day period, the retardation factor of nitrobenzene was 1.9(3). The Koc calculated from this experiment was 200(3). The sorption of nitrobenzene on two soils, a Captina silt loam (pH 4.97; 1.49% organic carbon) and a McLaurin sandy loam (pH 4.43; 0.66% organic carbon) was measured in the presence of a mixture of 16 organic chemicals; Koc values for nitrobenzene of 89 and 105.6 were measured for the Captina and McLaurin soils, respectively(4). Koc values of 89 and 100 were measured in river sediment (6.5-16.9% organic matter) and coal wastewater pond sediment (52% organic matter), respectively(5). Other reported Koc values for nitrobenzene were 158(6), 36(7), 156(8), 100(9), 62-74 to particulate organic matter and 34-38 to dissolved organic matter(10). According to a classification scheme(11), these measured Koc values suggest that nitrobenzene has very high to moderate mobility in soil(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: UN1662 (For reference only, please check.)

IMDG: UN1662 (For reference only, please check.)

IATA: UN1662 (For reference only, please check.)

UN Proper Shipping Name

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

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

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

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.)

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.)

Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

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 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. Do NOT take working clothes home.

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