

SAFETY DATA SHEET



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NITROBENZENE

SDS No. M0160

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Nitrobenzene

Synonyms: Nitrobenzol; Benzene, nitro-; Oil of Mirbane; Essence of Mirbane

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION



Classification:

Flammable Liquids: GHS Category 4

Acute Toxicity, Inhalation: GHS Category 3

Acute Toxicity, Oral: GHS Category 4

Carcinogenicity: GHS Category 1B

Reproductive Toxicity: GHS Category 1B

Specific Target Organ Toxicity, repeated exposure: GHS Category 1

Acute Aquatic Toxicity: GHS Category 2

Chronic Aquatic Toxicity: GHS Category 2

Label Elements

Signal Word: DANGER!

Hazard Statements:

H227 – Combustible liquid and vapor.

H301 – Toxic if swallowed.

H311 – Toxic in contact with skin.

H331 – Toxic if inhaled.

H351 – Suspected of causing cancer.

H361 – Suspected of damaging fertility or the unborn child.

H372 – Causes damage to organs through repeated or prolonged exposure.

H411 – Toxic to aquatic life with long lasting effects.

Precautionary Statements:

P260 – Do not breathe dust/ fume/ gas/ mist/ vapors spray.

P264 – Wash skin thoroughly after handling.

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

P273 – Avoid release to the environment.

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

P301+P310 – If SWALLOWED: Immediately call or POISON CENTER or a doctor.

P302+352+312 – IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor if you feel unwell.

P304+P340+P312 – IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

P403+P233 – Store in a well-ventilated place. Keep container tightly closed.

P501 – Dispose of contents/ container to an approved waste disposal plant.

Emergency Overview

Harmful and possibly fatal in swallowed, inhaled, or absorbed through the skin. May cause methemoglobinemia. Affects blood, liver, kidneys, liver, and reproductive system. Causes irritation to eyes and skin. Possible cancer hazard based on animal data. Combustible liquid and vapor. Target Organs: Blood, liver, kidneys, skin, and eyes.

HMIS Rating:

Health – 2* Flammability – 2 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Nitrobenzene	98-95-3	>99%	Yes

4. FIRST-AID MEASURES

Inhalation: Get medical help immediately. If inhaled, remove to fresh air. If breathing is labored, give supplemental oxygen. If not breathing, begin artificial respiration using a suitable mechanical device and oxygen. Do not use mouth-to-mouth respiration.

Ingestion: Get medical help immediately. Do not induce vomiting. Rinse mouth with water. Never give anything by mouth to an unconscious person.

Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Thorough cleansing of the entire contaminated area, to include hair and scalp is of the utmost importance. Dispose of contaminated clothing and shoes.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Notes to Physician: Consider methylene blue as an antidote.

5. FIRE FIGHTING MEASURES

Flammability: Combustible liquid and vapor (GHS Category 4)

Auto-ignition Temperature: 482° C (900° F)

Flash Point: 88° C (190° F)

Flammable Limits: Lower Limit – 1.8 vol %, Upper Limit – 40.0 vol %

Products of Combustion: Will decompose into highly toxic and irritating gases (carbon monoxide, carbon dioxide, and nitrogen oxides) under fire conditions.

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Combustion generates toxic fumes.

Specific Explosion Hazards: Above the flash point, explosive vapor-air mixtures may be formed. Contact with strong oxidizers may cause fire. Vapors can flow along surfaces to distant ignition source and flash back.

Fire Fighting Media: Use water spray, dry chemical, carbon dioxide, or alcohol foam.

Special Remarks: None

National Fire Protective Association: Health - 3, Flammability - 2, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Provide ventilation to the affected area and remove all ignition sources. Avoid run-off into storm sewers and ditches that lead to waterways. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Evacuate unnecessary personnel. Use only non-sparking tools and equipment. Use water spray to cool and disperse vapors. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Workers using this substance need preplacement and annual medical exams. Special training should be given to workers. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor.

Storage: Keep in a flammables area away from all sources of ignition and oxidizing materials. Keep in a tightly closed container and store under a nitrogen blanket. Store in a cool, dry, well-ventilated area away from incompatible substances.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Local ventilation is preferred because it controls emissions of contaminants at the source. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear protective chemical goggles and face shield or appropriate eye protection. Use butyl rubber gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits:

ACGIH – 1 ppm TWA;

NIOSH – 1 ppm TWA; 5 mg/m³ TWA; 200 ppm IDLH

OSHA Final PELs – 1 ppm TWA; 5 mg/m³ TWA;

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Pale yellow to brown oily liquid.

Odor: almond-like

Odor Threshold: <1 ppm

Molecular Formula: C₆H₅NO₂

Molecular Weight: 123.11

Auto-ignition Temperature: 482° C (900° F)

Flash Point: 88° C (190° F)

Flammable Limits: Lower Limit – 1.8 vol %, Upper Limit – 40.0 vol %

pH: Not available

Boiling Point: 211° C (412° F)

Freezing/Melting Point: 5.7° C (43° F)

Decomposition Temperature: Not available

Specific Gravity (water = 1): 1.2

Evaporation Rate(n-Butyl acetate = 1): Not available

Vapor Density (Air=1): 4.3

Vapor Pressure: 1.0 mm Hg @ 44° C

Viscosity: Not available

Solubility: Practically insoluble

Conductivity at 0°C: Conductive; Conductivity = 5×10^5 pS/m; Dielectric Constant = 34.82; Relaxation Time Constant = 6.2×10^{-4} seconds

10. STABILITY AND REACTIVITY

Stability: Stable under ordinary conditions of use and storage.

Conditions to Avoid: Ignition sources, heat, flame, freezing, incompatibles.

Incompatibility With Various Substances: Strong oxidizers, strong reducing agents, strong bases.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, carbon, dioxide.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Acute Exposure Hazards:

INHALATION HAZARD: May be absorbed through inhalation of vapors. Symptoms parallel those of ingestion exposure.

INGESTION HAZARD: May cause headache, shallow respiration, dizziness, vomiting, weakness, and blood pressure fall. Forms methemoglobin in the blood, reducing oxygen transport and producing cyanosis, and anemia. Convulsions, coma and death may follow. Symptoms may be delayed from 1 to 4 hours, and workers developing fatal cases of methemoglobinemia may not immediately feel sick. Because of bitter almond odor, cyanide poisoning may be suspected, but cyanide acts much faster. Poisoning closely resembles that due to aniline. Estimated lethal dose 1 to 5 grams.

SKIN CONTACT HAZARD: May be irritating and sensitizing to the skin. May be rapidly absorbed through the skin, with symptoms paralleling those of ingestion exposure.

EYE CONTACT HAZARD: Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

SYMPTOMS OF METHEMOGLOBINEMIA: Signs and symptoms of methemoglobinemia (methemoglobin >1%) include shortness of breath, cyanosis, mental status changes, headache, fatigue, exercise intolerance, dizziness and loss of consciousness. Arterial blood with elevated methemoglobin levels has a characteristic chocolate-brown color as compared to normal bright red oxygen containing arterial blood.

Chronic Exposure Hazards: Repeated or prolonged exposure through any route may cause damage to the central nervous system, liver, spleen, kidneys, and bone marrow. May also cause weight loss, anemia, jaundice, hemolysis, weakness, and irritability. A two year study titled "A Chronic Inhalation Toxicity Study of Nitrobenzene in B6CF1 Mice, Fischer 344 Rats and Sprague-Dawley Rats", was released by the Chemical Industry Institute of Toxicology (CIIT). The report indicates that Nitrobenzene has weak carcinogenic activity in rodents after chronic inhalation exposure and may express carcinogenic activity in humans. Based upon the result of this animal testing, Nitrobenzene should be handled as a potential carcinogen. Persons with pre-existing skin or blood disorders or impaired liver, kidney, or cardiovascular function may be more susceptible to the effects of this substance. The influence of ethyl alcohol may aggravate the toxic effects of nitrobenzene.

Animal Toxicity:

Oral rat LD50: 349 mg/kg; skin rat LD50: 2100 mg/kg;

Inhalation rat LC50: 556 ppm/4H; investigated as a mutagen, reproductive effector;

Carcinogenicity:

ACGIH: A3- Confirmed Animal Carcinogen with Unknown Relevance to Humans.

California: Warning. This product contains a chemical known to the state of California to cause cancer.

Not listed as a carcinogen by IARC and NTP.

A two year study titled "A Chronic Inhalation Toxicity Study of Nitrobenzene in B6CF1 Mice, Fischer 344 Rats and Sprague-Dawley Rats" was released by the Chemical Industry Institute of Toxicology (CIIT). The report indicates that Nitrobenzene has weak carcinogenic activity in rodents after chronic inhalation exposure and may express carcinogenic activity in humans. Based upon the result of this animal testing, Nitrobenzene should be handled as a potential carcinogen.

Epidemiology: No information found.

Teratogenicity: No information found.

Reproductive Effects: In laboratory animals, this compound has caused both birth defects and damage to the reproductive system.

Mutagenicity: No information found.

Neurotoxicity: No information found.

12. ECOLOGICAL INFORMATION

Ecotoxicity: The EC50/48-hour values for daphnia are between 10 and 100 mg/l. The LC50/96-hour values for fish are over 100 mg/l. This material may be toxic to aquatic life.

Environmental Fate: When released into the soil, this material may leach into groundwater. When released into water, this material may evaporate to a moderate extent. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by photolysis. When released into the air, this material is expected to have a half-life of less than 1 day.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is listed as U169 under 40 CFR 261.

14. TRANSPORT INFORMATION

US DOT

Proper Shipping Name: Nitrobenzene

Hazard Class: 6.1

UN Number: UN1662

Packing Group: II

IMDG

Proper Shipping Name: Nitrobenzene

Hazard Class: 6.1

UN Number: UN1662

Packing Group: II

IATA

Proper Shipping Name: Nitrobenzene

Hazard Class: 6.1

UN Number: UN1662

Packing Group: II

15. REGULATORY INFORMATION

US Federal Regulations:

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CERCLA Hazardous Substances: CAS# 98-95-3 – 1000 lb final RQ; 454 kg final RQ

SARA Section 302: 10,000 lb TPQ

SARA Codes: CAS# CAS# 98-95-3 – acute, chronic, fire

Section 313: Nitrobenzene (CAS# 98-95-3) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

CAS# 98-95-3 is on the following state right-to-know lists: New Jersey, Pennsylvania, and Massachusetts

California: Warning. This product contains a chemical known to the state of California to cause cancer, birth defects, or other reproductive harm.

16. OTHER INFORMATION

Originally Prepared: 10/24/2006

Last Revised: 07/10/2018 – Updated hazards statements, and precautionary statements in Section 2.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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