TCI AMERICA

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	**Toxic compound, do not ingest or inhale. Avoid all contact with this material.** **Combustible material; avoid heat and sources of ignition.** **Environmental hazard.** **This material is toxic to aquatic organisms and may cause long term adverse effects to the aquatic environment.** **POSSIBLE CARCINOGEN. MINIMIZE EXPOSURE.** **Readily absorbed through skin.**	

Section I. Chemical Product and Company Identification

Chemical Name **Nitrobenzene**

Catalog Number	N0758
Synonym	Not available.
Chemical Formula	$C_6H_5NO_2$
CAS Number	98-95-3

Supplier: TCI America
9211 N. Harborgate St.
Portland OR
1-800-423-8616

In case of Emergency Call: **Chemtrec®**
(800) 424-9300 (U.S.)
(703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Nitrobenzene	98-95-3	Min. 98.0 (GC)	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LD_{50} (oral) 349 mg/kg Rat LD_{50} (dermal) 2100 mg/kg Rat LC_{50} (inhalation) 556 ppm/4H Rat LD_{50} (intraperitoneal) 640 mg/kg Mouse LD_{50} (oral) 590 mg/kg

Section III. Hazards Identification

Acute Health Effects

Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death.
Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Readily absorbed through skin.
Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Chronic Health Effects

CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Tumorigenic Effects.
Rat TCLo Inhalation 25 ppm/6 hours/2 years intermittent
TOXIC Effects:
Tumorigenic - Neoplastic by RTECS criteria
Liver - Tumors
Mouse TCLo Inhalation 50 ppm/6 hours/2 years intermittent
TOXIC Effects:
Tumorigenic - Neoplastic by RTECS criteria
Lung, Thorax, or Respiration - Tumors
Skin and Appendages - Tumors
DEVELOPMENTAL TOXICITY: Reproductive Effects.
Rat TCLo Inhalation 40 ppm/6 hours, male 12 weeks prior to mating
TOXIC Effects:
Paternal Effects - Spermatogenesis
Paternal Effects - Testes, epididymis, sperm duct
Paternal Effects - Prostate, seminal vessical, Cowper's gland, accessory glands
Rat TCLo Inhalation 1260 ug/m3/4 hours, femal 1-21 days of pregnancy
Effects on Fertility - Pre-implantation mortality
Effects on Embryo or Fetus - Fetal death
Specific Developmental Abnormalities - Other developmental abnormalities
Rat TDLo Oral 1260 mg/kg, male 21 days prior to mating
TOXIC Effects:
Paternal Effects - Spermatogenesis
Paternal Effects - Testes, epididymis, sperm duct
Effects on Fertility - Male fertility index

Continued on Next Page *Emergency phone number (800) 424-9300*

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Combustible.	Auto-Ignition	480°C (896°F)
Flash Points	88°C (190.4°F).	Flammable Limits	LOWER: 1.8% UPPER: 40%

Combustion Products	These products are toxic carbon oxides (CO, CO_2), nitrogen oxides (NO, NO_2).
Fire Hazards	Not available.
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	Combustible liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet. Consult with local fire authorities before attempting large scale fire-fighting operations.

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Toxic material. Combustible material. Environmentally hazardous material. Irritating material. Possibly carcinogenic material. Material is readily absorbed through skin. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. DO NOT get water inside container. DO NOT touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information	TOXIC. COMBUSTIBLE. ENVIRONMENTAL HAZARD. IRRITANT. POSSIBLE CARCINOGEN. READILY ABSORBED THROUGH SKIN. Keep locked up. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents, reducing agents, alkalis (bases).

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. 
Exposure Limits	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear, Light Yellow.)	Solubility	Very soluble in alcohol, ether, benzene. Soluble in acetone. Very slightly soluble in water.
Specific Gravity	1.203 (water=1)		
Molecular Weight	123.11	Partition Coefficient	Log P_{ow}: 1.85
Boiling Point	210 to 211°C (410 to 411.8°F) @ 760 mmHg	Vapor Pressure	20 Pa (@ 20°C)
Melting Point	6°C (42.8°F)	Vapor Density	4.2 (Air = 1)
Refractive Index	1.552	Volatility	Not available.
Critical Temperature	Not available.	Odor	Almond
Viscosity	Not available.	Taste	Not available.

Continued on Next Page

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with strong oxidizing agents, strong reducing agents, strong alkalis (bases).

Section XI. Toxicological Information

RTECS Number	DA6475000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD_{50} (oral) 349 mg/kg Rat LD_{50} (dermal) 2100 mg/kg Rat LC_{50} (inhalation) 556 ppm/4H Rat LD_{50} (intraperitoneal) 640 mg/kg Mouse LD_{50} (oral) 590 mg/kg
Chronic Toxic Effects	**CARCINOGENIC EFFECTS** : Not available. **MUTAGENIC EFFECTS** : Not available. **TERATOGENIC EFFECTS** : Tumorigenic Effects. Rat TCLo Inhalation 25 ppm/6 hours/2 years intermittent TOXIC Effects: Tumorigenic - Neoplastic by RTECS criteria Liver - Tumors Mouse TCLo Inhalation 50 ppm/6 hours/2 years intermittent TOXIC Effects: Tumorigenic - Neoplastic by RTECS criteria Lung, Thorax, or Respiration - Tumors Skin and Appendages - Tumors **DEVELOPMENTAL TOXICITY**: Reproductive Effects. Rat TCLo Inhalation 40 ppm/6 hours, male 12 weeks prior to mating TOXIC Effects: Paternal Effects - Spermatogenesis Paternal Effects - Testes, epididymis, sperm duct Paternal Effects - Prostate, seminal vessical, Cowper's gland, accessory glands Rat TCLo Inhalation 1260 ug/m3/4 hours, femal 1-21 days of pregnancy Effects on Fertility - Pre-implantation mortality Effects on Embryo or Fetus - Fetal death Specific Developmental Abnormalities - Other developmental abnormalities Rat TDLo Oral 1260 mg/kg, male 21 days prior to mating TOXIC Effects: Paternal Effects - Spermatogenesis Paternal Effects - Testes, epididymis, sperm duct Effects on Fertility - Male fertility index
Acute Toxic Effects	Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Readily absorbed through skin. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	Nitrobenzene's production and use in the manufacture of aniline and other chemical compounds such as benzidine and quinoline, as a solvent, and in the manufacture of soaps and shoe polishes may result in its release to the environment through various waste streams. Nitrobenzene may also form in the atmosphere from the photochemical reaction of benzene with oxides of nitrogen. If released to the atmosphere, nitrobenzene should exist mainly in the vapor phase based on a vapor pressure of 0.245 mm Hg at 25 deg C, from experimentally-derived coefficients. Vapor-phase nitrobenzene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals with an estimated half-life of about 115 days. In the atmosphere, nitrobenzene should degrade primarily by photolysis (38% degradation in 5 hr). Measured Koc values ranging from 30.6 to 370 suggest that nitrobenzene may have moderate to very high mobility in soil. Volatilization of nitrobenzene may be important from moist soil surfaces given a measured Henry's Law constant of 2.40X10-5 atm-cu m/mole. Nitrobenzene is expected to biodegrade under both aerobic and anaerobic conditions in both soil and water. Nitrobenzene had a half-life of 56 days in an aerobic soil column. A proposed catabolic pathway involves the reduction of nitrobenzene to nitrosobenzene, to hydroxylaminobenzene and to 2-aminophenol which then undergoes meta ring cleavage to 2-aminomuconic semialdehyde. Under anaerobic conditions using a sewage inoculum in a batch reactor, 50% degradation occurred in 14 days including an 8 day lag period; aniline was a major reaction product. In water, nitrobenzene should not adsorb to suspended matter in the water column based on a measured Koc value of 89 measured in river sediment. Nitrobenzene may be degraded in water by photolysis (a half-life of 133 days), by reaction with hydrated electrons in eutrophic lakes (a half-life of 22 days), or by reaction with sunlight and nitrate (a measured half-life of 11 hours). Nitrobenzene is expected to volatilize from water surfaces given its measured Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 2 and 17 days, respectively. The potential for bioconcentration in aquatic organisms is expected to be low based on measured BCF values ranging from 1.6-15. Human exposure will be primarily occupational via inhalation of the vapor or dermal contact with the vapor or liquid.

Continued on Next Page

Section XIII. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification	DOT Class 6.1: Toxic material
PIN Number	UN1662
Proper Shipping Name	Nitrobenzene
Packing Group (PG)	II Marine Pollutant
DOT Pictograms	

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This compound is **ON** the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). On DSL
EINECS Number (EEC)	202-716-0
EEC Risk Statements	R23/24/25- Toxic by inhalation, in contact with skin and if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin. R45- May cause cancer. R51- Toxic to aquatic organisms. R53- May cause long-term adverse effects in the aquatic environment.
Japanese Regulatory Data	Not available.

Section XVI. Other Information

Version 1.0
Validated on 3/19/2007.
Printed 3/19/2007.

Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.