

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
   	Toxic compound, do not ingest or inhale. Avoid all contact with this material. Irritating to skin, eyes, and the respiratory system. This compound is a skin sensitizer. CARCINOGEN. MINIMIZE EXPOSURE. POSSIBLE MUTAGEN. MINIMIZE EXPOSURE. Environmental hazard. This material is toxic to aquatic organisms and may cause long term adverse effects to the aquatic environment.	   

Section I. Chemical Product and Company Identification

Chemical Name	4-Chloronitrobenzene		
Catalog Number	C0222	Supplier	TCI America 9211 N. Harbortgate St. Portland OR 1-800-423-8616
Synonym	Benzene, 1-chloro-4-nitro- (CA INDEX NAME); 1-Chloro-4-nitrobenzene		
Chemical Formula	C ₆ H ₄ ClNO ₂		
CAS Number	100-00-5	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
4-Chloronitrobenzene	100-00-5	Min. 98.0 (GC)	This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen. This compound is classified as a possible mutagen. There is no acceptable exposure limit for a mutagen.	Rat LD₅₀ (oral) 420 mg/kg Rabbit LD₅₀ (dermal) 3040 mg/kg Rat LD₅₀ (intraperitoneal) 420 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. Skin contact may result in sensitization. Always cover all exposed skin with an impermeable layer and use proper eye protection. A OSHA/MSHA approved dust and vapor respirator is required when working with this material. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Tumorigenic effects. Mouse TD Oral 390 gm/kg for 78 weeks continuous Toxic Effects: Tumorigenic - Carcinogenic by RTECS criteria Vascular - Tumors Liver - Tumors Mouse TDLo Oral 194 gm/kg for 78 weeks continuous Toxic Effects: Tumorigenic - Carcinogenic by RTECS criteria Vascular - Tumors Liver - Tumors DEVELOPMENTAL TOXICITY: Reproductive effects. Rat TCLO Inhalation 24 ppm for 6 hours, male 13 weeks prior to mating Toxic Effects: Paternal Effects - Spermatogenesis Mouse TDLo Oral 58 gm/kg, male 15 weeks prior to mating Toxic Effects: Effects on Newborn - Live birth index Effects on Newborn - Viability index Effects on Newborn - Growth statistics Mouse TDLo Oral 250 mg/kg, female multigenerations Toxic Effects: Specific Developmental Abnormalities - Blood and lymphatic system Specific Developmental Abnormalities - Hepatobiliary system Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

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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	May be combustible at high temperature.	Auto-Ignition	510 °C (950 °F)
Flash Points	127 °C (260.6 °F)	Flammable Limits	LOWER: 1.5% UPPER: 9.6%
Combustion Products	These products are toxic carbon oxides (CO, CO ₂), nitrogen oxides (NO, NO ₂), halogenated compounds. WARNING: Highly toxic HCl gas is produced during combustion.		
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	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. Irritating material. This material is a skin sensitizer. Carcinogenic material. Possibly mutagenic material. Environmentally hazardous material. 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. Eliminate all sources of ignition. Consult federal, state, and/or local authorities for assistance on disposal.
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Section VII. Handling and Storage

Handling and Storage Information	TOXIC. IRRITANT. SENSITIZER. CARCINOGEN. POSSIBLE MUTAGEN. ENVIRONMENTAL HAZARD. Keep locked up. Keep away from heat. Mechanical exhaust required. When not in use, tightly seal the container and store in a dry, cool place. Avoid excessive heat and light. DO NOT ingest. Do not breathe dust. 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, combustible materials, alkalis (bases).
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Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust 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 carcinogen. There is no acceptable exposure limit for a carcinogen. This compound is classified as a possible mutagen. There is no acceptable exposure limit for a mutagen.

Section IX. Physical and Chemical Properties

Physical state @ 20 °C	Solid. (Crystal ~ powder, slightly pale yellow ~ yellow-green.)	Solubility	Freely soluble in boiling alcohol, ether, carbon disulfide. Soluble in methanol, benzene. Sparingly soluble in cold alcohol. Insoluble in water (0.45g/L 20 °C).
Specific Gravity	1.520 (water=1)		
Molecular Weight	157.55	Partition Coefficient	LOG P _{ow} : 2.39
Boiling Point	242 °C (467.6 °F)	Vapor Pressure	2 Pa (@ 30 °C)
Melting Point	84 °C (183.2 °F)	Vapor Density	5.44 (Air = 1)
Refractive Index	Not available.	Volatility	Not available.
Critical Temperature	Not available.	Odor	Characteristic.
Viscosity	Not available.	Taste	Not available.

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 oxidizing agents, combustible materials, alkalis (bases).

Section XI. Toxicological Information

RTECS Number	CZ1050000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD ₅₀ (oral) 420 mg/kg Rabbit LD ₅₀ (dermal) 3040 mg/kg Rat LD ₅₀ (intraperitoneal) 420 mg/kg
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Tumorigenic effects. Mouse TD Oral 390 gm/kg for 78 weeks continuous Toxic Effects: Tumorigenic - Carcinogenic by RTECS criteria Vascular - Tumors Liver - Tumors Mouse TDLo Oral 194 gm/kg for 78 weeks continuous Toxic Effects: Tumorigenic - Carcinogenic by RTECS criteria Vascular - Tumors Liver - Tumors DEVELOPMENTAL TOXICITY : Reproductive effects. Rat TCLo Inhalation 24 ppm for 6 hours, male 13 weeks prior to mating Toxic Effects: Paternal Effects - Spermatogenesis Mouse TDLo Oral 58 gm/kg, male 15 weeks prior to mating Toxic Effects: Effects on Newborn - Live birth index Effects on Newborn - Viability index Effects on Newborn - Growth statistics Mouse TDLo Oral 250 mg/kg, female multigenerations Toxic Effects: Specific Developmental Abnormalities - Blood and lymphatic system Specific Developmental Abnormalities - Hepatobiliary system Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
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. Skin contact may result in sensitization. Always cover all exposed skin with an impermeable layer and use proper eye protection. A OSHA/MSHA approved dust and vapor respirator is required when working with this material. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	1-Chloro-4-nitrobenzene's production and use as an intermediate in preparing dyes, agricultural and rubber chemicals, may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 0.022 mm Hg at 25 deg C indicates 1-chloro-4-nitrobenzene will exist solely as a vapor in the atmosphere. Vapor-phase 1-chloro-4-nitrobenzene will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 94 days. Weak absorption of UV light greater than 290 nm by 1-chloro-4-nitrobenzene indicates potential for photolysis by sunlight. If released to soil, 1-chloro-4-nitrobenzene is expected to have moderate mobility in soil based on an estimated Koc value of 310. Volatilization from dry soil surfaces may occur given a Henry's Law constant of 4.9X10 ⁻⁶ atm-cu m/mole. 1-Chloro-4-nitrobenzene is not expected to volatilize from dry soil surfaces based upon its vapor pressure. Screening tests using activated sludge, suggest biodegradation of 1-chloro-4-nitrobenzene proceeds slowly in water and soil. If released into water, 1-chloro-4-nitrobenzene is expected to adsorb to suspended solids and sediment based upon the estimated Koc. Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 152 hours and 73 days, respectively. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions. BCF values of 5.8-20.9 measured in fish, suggests bioconcentration in aquatic organisms is low. Occupational exposure may occur through inhalation and dermal contact with this compound at workplaces where 1-chloro-4-nitrobenzene is produced or used.

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

UN1578

Proper Shipping Name

Chloronitrobenzenes, solid

Packing Group (PG)

II

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 D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2B: Material causing other toxic effects (TOXIC).
On DSL.

EINECS Number (EEC)

202-809-6

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.
R43- May cause sensitization by skin contact.
R45- May cause cancer.
R46- May cause heritable genetic damage.
R47- May cause birth defects.
R51- Toxic to aquatic organisms.
R53- May cause long-term adverse effects in the aquatic environment.

Japanese Regulatory Data

ENCS No. 3-442

Section XVI. Other Information**Version 1.0****Validated on 7/29/2011.****Printed 7/29/2011.****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.