1,4-Phenylenediamine dihydrochloride

sc-237770

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
1,4-Phenylenediamine dihydrochloride

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C6H8N2Cl2, C6H4(NH2)2.2HCl, "p-phenylenediamine dihydrochloride", "p-aminoaniline dihydrochloride", "4-aminoaniline dihydrochloride", "1, 4-benzenediamine hydrochloride", "p-benzenediamine dihydrochloride", "p-diaminobenzene dihydrochloride", "1, 4-diaminobenzene dihydrochloride", "1, 4-phenylenediamine dihydrochloride", "C.I. 76061", "C.I. Oxidation Base 10A", "Durafur Black RC", "Fourrine 64, DS", "Pelagol Grey CD", "PCD HCl", "PPDA HCl", "colour developer"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	3		
Body Contact:	3		
Reactivity:	1		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Irritating to eyes.
May cause SENSITISATION by skin contact.
Toxic by inhalation, in contact with skin and if swallowed.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ Systemic effects of p-phenylenediamine include asthma, gastritis (regardless of portal of entry), rises in blood pressure, transudation in serous cavities, vertigo, tremors, convulsions, and coma.
Single oral doses of p-phenylenediamine can produce kidney failure.

EYE

■ This material can cause eye irritation and damage in some persons.

SKIN

■ Skin contact with the material may produce toxic effects; systemic effectsmay result following absorption.
■ The material is not thought to be a skin irritant (as classified using animal models).
Abrasive damage however, may result from prolonged exposures.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects.
■ The material is not thought to produce respiratory irritation (as classified using animal models).
Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

■ Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.
p-Phenylenediamine is suspected as a cause of bladder cancers in "aniline' workers.
Long term exposure to p-phenylenediamine may produce mucosal irritation, asthma, oedema and liver damage. "Ursol" asthma and persistent irritation of the upper airways of workers in the fur industry has been described. In 30% of workers employed in the dying of skins, p-phenylenediamine caused skin lesions, eczematous rashes, irritation of the upper respiratory tract and occasional asthma attacks. One skin dyer developed severe bronchial asthma after working with "Ursol" for one year; the asthma attacks always developed half an hour after work. Long term dermal exposure to
p-phenylenediamine in hair dyes caused such severe damage of the kidneys and other organs that it resulted in the more or less rapid death of several persons.
In vitro, after metabolic activation, p-phenylenediamine is mutagenic; in the Ames test the mutagenicity is increased by the addition of hydrogen peroxide (a chemical commonly used by hair dressers). There is no evidence that p-phenylenediamine has embryotoxic or teratogenic potential. Present data does not dispel the suspicion that p-phenylenediamine has carcinogenic potential.
Phenylenediamine derivatives can cause skin damage, which generallydisappears when exposure ceases.
Most arylamines are powerful poisons to the blood-making system. High chronic doses cause congestion of the spleen and tumor formation.
p-Phenylenediamine dihydrochloride was evaluated against guinea pigs where weak dermal allergic responses were recorded.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
p-phenylenediamine hydrochloride	624-18-0	> 99

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not

immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs: · Quickly but gently, wipe material off skin with a dry, clean cloth. · Immediately remove all contaminated clothing, including footwear.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ Treat symptomatically.
for poisons (where specific treatment regime is absent):
----------BASIC TREATMENT

· Establish a patent airway with suction where necessary.
· Watch for signs of respiratory insufficiency and assist ventilation as necessary.
Wherever histamine-like effects predominate, a therapeutic trial with an antihistaminic is suggested. Not likely to induce significant methaemoglobinaemia.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not available.

EXTINGUISHING MEDIA

· Water spray or fog.
· Foam.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), hydrogen chloride, phosgene, nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Clean up waste regularly and abnormal spills immediately.
· Avoid breathing dust and contact with skin and eyes.
· Wear protective clothing, gloves, safety glasses and dust respirator.
· Use dry clean up procedures and avoid generating dust.
· Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
· Dampen with water to prevent dusting before sweeping.
· Place in suitable containers for disposal.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
· Do NOT cut, drill, grind or weld such containers.
· In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

■ Glass container.
· Lined metal can, Lined metal pail/drum
· Plastic pail.
For low viscosity materials
· Drums and jerricans must be of the non-removable head type.
· Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

· Store in original containers.
· Keep containers securely sealed.
Light sensitive.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	p-phenylenediamine hydrochloride (p-Phenylenediamine)		0.1						
Canada - British Columbia Occupational Exposure Limits	p-phenylenediamine hydrochloride (p-Phenylenediamine)		0.1						S
US NIOSH Recommended Exposure Limits (RELs)	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1						[skin]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1						
US ACGIH Threshold Limit Values (TLV)	p-phenylenediamine hydrochloride (p-Phenylenediamine)		0.1						TLV Basis: upper respiratory tract irritation; skin sensitization
US - Minnesota Permissible Exposure Limits (PELs)	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1						

Air Contaminants							
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1				
US - California Permissible Exposure Limits for Chemical Contaminants	p-phenylenediamine hydrochloride (p-Phenylenediamine)		0.1				
US - Idaho - Limits for Air Contaminants	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1				
US - Alaska Limits for Air Contaminants	p-phenylenediamine hydrochloride (p -Phenylene diamine)		0.1				
US - Michigan Exposure Limits for Air Contaminants	p-phenylenediamine hydrochloride (p-Phenylenediamine)		0.1				
US - Hawaii Air Contaminant Limits	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1				
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	p-phenylenediamine hydrochloride (p-Phenylene diamine - Skin)	-	0.1	-	0.1		
US - Washington Permissible exposure limits of air contaminants	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1		0.3		
US - Oregon Permissible Exposure Limits (Z-1)	p-phenylenediamine hydrochloride (p-Phenylene diamine)	-	0.1				
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	p-phenylenediamine hydrochloride (p-Phenylene diamine)		0.1				
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	p-phenylenediamine hydrochloride (para-Phenylenediamine)		0.1				
Canada - Prince Edward Island Occupational Exposure Limits	p-phenylenediamine hydrochloride (p-Phenylenediamine)		0.1				TLV Basis: upper respiratory tract irritation; skin sensitization
Canada - Northwest Territories Occupational Exposure Limits (English)	p-phenylenediamine hydrochloride (p-Phenylene diamine - Skin)		0.1		0.3		

Canada - Nova Scotia Occupational Exposure Limits	p-phenylenediamine hydrochloride (p-Phenylenediamine)	0.1		TLV Basis: upper respiratory tract irritation; skin sensitization
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	p-phenylenediamine hydrochloride (Phenylene diamine isomers)	0.1	0.3	

ENDOELTABLE

PERSONAL PROTECTION

RESPIRATOR

•Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

· Safety glasses with side shields.
· Chemical goggles.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.
NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

· Overalls.
· Eyewash unit.

ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Mixes with water.

State	Divided solid	Molecular Weight	181.07
Melting Range (°F)	Not available	Viscosity	Not Applicable
Boiling Range (°F)	Not available	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not available	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Negligible

Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available.	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Negligible	Evaporation Rate	Not available

APPEARANCE
Off-white or slightly red powder; mixes with water. Becomes darker on exposure to air.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY
· Many arylamines (aromatic amines such as aniline, N-ethylaniline, o-toluidine, xylidine etc. and their mixtures) are hypergolic (ignite spontaneously) with red fuming nitric acid. When the amines are dissolved in triethylamine, ignition occurs at -60 deg. C. or less.
· Various metal oxides and their salts may promote ignition of amine-red fuming nitric acid systems. Soluble materials such as copper(I) oxide, ammonium metavanadate are effective; insoluble materials such as copper(II) oxide, iron(II) oxide, potassium dichromate are also effective.
· Avoid oxidizing agents, acids, acid chlorides, acid anhydrides.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

p-phenylenediamine hydrochloride

TOXICITY AND IRRITATION
P-PHENYLENEDIAMINE HYDROCHLORIDE:
■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 147 mg/kg	Nil Reported

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.
p-Phenylenediamines are oxidised by the liver microsomal enzymes (S9). Pure p-phenylenediamine is non-mutagenic in but becomes mutagenic after it is oxidized. Azo dyes containing phenylenediamine are mutagenic in certain assay most likely due to the formation of oxidized p-phenylenediamine. Modification of the moieties that can be metabolized to p-phenylenediamine by sulfonation, carboxylation or copper complexation eliminated the mutagenic responses.
Human lymphocyte cell mutagen in vivo
IARC Cancer Review: Animal Inadequate Evidence.

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
p-phenylenediamine hydrochloride	HIGH	No Data Available	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.

· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 6.1
Identification Numbers: UN2811 PG: III
Label Codes: 6.1 Special provisions: IB8, IP3,
T1, TP33
Packaging: Exceptions: 153 Packaging: Non- bulk: 213
Packaging: Exceptions: 153 Quantity limitations: 100 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 200 kg Vessel stowage: Location: A
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Toxic solids, organic, n.o.s.

Air Transport IATA:

UN/ID Number: 2811 Packing Group: III
Special provisions: A3
Cargo Only
Packing Instructions: 677 Maximum Qty/Pack: 200 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: Y645 Maximum Qty/Pack: 100 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: 670 Maximum Qty/Pack: 10 kg
Shipping Name: TOXIC SOLID, ORGANIC, N.O.S. *(CONTAINS P-
PHENYLENEDIAMINE HYDROCHLORIDE)

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: None
UN Number: 2811 Packing Group: III
EMS Number: F-A,S-A Special provisions: 223 274
Limited Quantities: 5 kg Marine Pollutant: Yes
Shipping Name: TOXIC SOLID, ORGANIC, N.O.S.(contains p-phenylenediamine hydrochloride)

Section 15 - REGULATORY INFORMATION

p-phenylenediamine hydrochloride (CAS: 624-18-0) is found on the following regulatory lists;
"Canada Domestic Substances List (DSL)","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.
■ Limited evidence of a carcinogenic effect*.
■ Possible respiratory sensitiser*.
* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use,

frequency of use and current or available engineering controls must be considered.

Issue Date: May-24-2008

Print Date:Jul-27-2011