SAFETY DATA SHEET

1. Identification

Product identifier **p-Chloroaniline**

Other means of identification

Catalog number 1111908

Synonyms 4-Chlorophenylamine * 1-Amino-4-chlorobenzene

Chemical name p-Chloroaniline

Recommended use Specified quality tests and assay use only.

Recommended restrictions Not for use as a drug. Not for administration to humans or animals.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name U. S. Pharmacopeia

Address 12601 Twinbrook Parkway
Rockville
MD
20852-1790
United States

Telephone RS Technical Services 301-816-8129

Website www.usp.org

E-mail RSTECH@usp.org

Emergency phone number CHEMTREC within US & Canada 1-800-424-9300
CHEMTREC outside US & Canada +1 703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Acute toxicity, oral	Category 3
Acute toxicity, dermal	Category 3
Acute toxicity, inhalation	Category 4
Serious eye damage/eye irritation	Category 2A
Sensitization, skin	Category 1
Carcinogenicity	Category 1B

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Toxic if swallowed. Toxic in contact with skin. Harmful if inhaled. Causes serious eye irritation. May cause an allergic skin reaction. May cause cancer.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing dust/fume. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Immediately call a poison center/doctor. Rinse mouth. If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. If exposed or concerned: Get medical advice/attention. Take off immediately all contaminated clothing and wash it before reuse.

Storage Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Substance

Chemical name	Common name and synonyms	CAS number	%
p-Chloroaniline	4-Chlorophenylamine 1-Amino-4-chlorobenzene	106-47-8	100

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Remove contaminated clothing immediately and wash skin with soap and water. Get medical advice/attention if you feel unwell. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Wash contaminated clothing before reuse.
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Get medical advice/attention if you feel unwell.
Most important symptoms/effects, acute and delayed	Irritation of eyes and mucous membranes. May cause allergic skin reaction. Blood disorders. Central nervous system effects.
Indication of immediate medical attention and special treatment needed	Treatment may include the following: Do not induce vomiting. Consider gastric lavage if it can be performed soon after ingestion, unless contraindicated. Control seizures first. Administer activated charcoal as a slurry. Treat methemoglobinemia with IV methylene blue. Administer 100% supplemental oxygen and consider hyperbaric oxygen therapy in patients not responding to methylene blue. Exchange transfusion may be needed. Infuse 10 - 20 mL/kg isotonic fluid to control hypotension. If persistent, treat with intravenous administration of vasopressors such as dopamine or norepinephrine. [Poisindex 2008]
General information	Remove from exposure. Remove contaminated clothing. For treatment advice, seek guidance from an occupational health physician or other licensed health-care provider familiar with workplace chemical exposures. In the United States, the national poison control center phone number is 1-800-222-1222. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen if available. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Dry chemical or CO2. Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	No unusual fire or explosion hazards noted.
Special protective equipment and precautions for firefighters	Wear suitable protective equipment.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate personal protective equipment. Avoid inhalation of dust from the spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	For waste disposal, see section 13 of the SDS. Avoid the generation of dusts during clean-up. Sweep up or vacuum up spillage and collect in suitable container for disposal. Clean surface thoroughly to remove residual contamination. Wash spill site.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling
As a general rule, when handling USP Reference Standards, avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Clean equipment and work surfaces with suitable detergent or solvent after use. After removing gloves, wash hands and other exposed skin thoroughly. Use of a designated area is recommended for handling of potent materials.

Conditions for safe storage, including any incompatibilities
Store in tight container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

8. Exposure controls/personal protection

Occupational exposure limits
No exposure limits noted for ingredient(s).

Biological limit values
No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls
Airborne exposure should be controlled primarily by engineering controls such as general dilution ventilation, local exhaust ventilation, or process enclosure. Local exhaust ventilation is generally preferred to general exhaust because it can control the contaminant at its source, preventing dispersion into the work area. An industrial hygiene survey involving air monitoring may be used to determine the effectiveness of engineering controls. Effectiveness of engineering controls intended for use with highly potent materials should be assessed by use of nontoxic surrogate materials.

Individual protection measures, such as personal protective equipment

Eye/face protection
Safety glasses with sideshields are recommended. Face shields or goggles may be required if splash potential exists or if corrosive materials are present. Approved eye protection (e.g., bearing the ANSI Z87 or CSA stamp) is preferred. Maintain eyewash facilities in the work area.

Skin protection

Hand protection
Chemically compatible gloves. For handling solutions, ensure that the glove material is protective against the solvent being used. Use handling practices that minimize direct hand contact. Employees who are sensitive to natural rubber (latex) should use nitrile or other synthetic nonlatex gloves. Use of powdered latex gloves should be avoided due to the risk of latex allergy. To reduce the risk of contamination of skin and surfaces, wear two pairs of gloves. Remove the outer gloves after handling and cleanup of the material, and remove the inner gloves only after removing other personal protective equipment.

Other
For handling of laboratory scale quantities, a disposable lab coat or isolation gown over street clothes is recommended. Where significant quantities are handled, work clothing and booties may be necessary to prevent take-home contamination.

Respiratory protection
Where respirators are deemed necessary to reduce or control occupational exposures, use NIOSH-approved respiratory protection and have an effective respirator program in place (applicable U.S. regulation OSHA 29 CFR 1910.134).

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical state
Solid.

Form
Powder.

Color
White. Light yellow.

Odor
Characteristic odor.

Odor threshold
1.5 mg/l (287 ppm)

pH
Not available.

Melting point/freezing point
154.4 - 162.5 °F (68 - 72.5 °C)

Initial boiling point and boiling range
446 - 449.6 °F (230 - 232 °C)

Flash point
Not available.

Evaporation rate
Not available.

Flammability (solid, gas)
Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)
Not available.

Flammability limit - upper (%)
Not available.

Explosive limit - lower (%)
Not available.

Explosive limit - upper (%)
Not available.

Vapor pressure
0.15 mm Hg at 25 ° C

Vapor density	4.41 (air = 1)
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Slightly soluble in cold water; soluble in hot water.
Solubility (other)	Freely soluble in alcohol, in ether, in acetone, and in carbon disulfide.
Partition coefficient (n-octanol/water)	1.83 at pH 7.4
Auto-ignition temperature	1265 °F (685 °C)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Chemical family	Aromatic amine.
Dynamic viscosity	0.02 g cm-1 s-1 (131 °F (55 °C))
Molecular formula	C6H6ClN
Molecular weight	127.57
Percent volatile	0 %
pH in aqueous solution	6.9 at 20 ° (1 gram/L)
Specific gravity	1.17 at 77 ° C
VOC (Weight %)	0 %

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Peroxides. Phenols. Strong oxidizing agents. Acids. Acid chlorides. Acid anhydrides.
Hazardous decomposition products	Irritating and/or toxic fumes or gases. Emits toxic fumes under fire conditions. NOx. Cl-.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Toxic by inhalation. Based on information from industrial exposure, this material may cause: Central nervous system effects. Blood disorders.
Skin contact	Toxic in contact with skin. May cause an allergic skin reaction. Based on information from industrial exposure, this material may cause: Central nervous system effects. Blood disorders.
Eye contact	Causes serious eye irritation.
Ingestion	This material may cause: Blood disorders.
Symptoms related to the physical, chemical, and toxicological characteristics	Central nervous system depression. Cyanosis (blue tissue condition, nails, lips, and/or skin). Headache. Visual disturbances. Nausea. Muscle pain. Seizures. Irregular heartbeat. Difficulty breathing.

Information on toxicological effects

Acute toxicity Toxic by inhalation. Toxic in contact with skin.

Product	Species	Test Results
p-Chloroaniline (CAS 106-47-8)		
Acute		
Dermal		
LD50	Rabbit	360 mg/kg
Inhalation		
LC50	Rat	2.34 mg/l, 4 Hours
Oral		
LD50	Rat	200 - 480 mg/kg

Skin corrosion/irritation	Based on available data, the classification criteria are not met.
Serious eye damage/eye irritation	Causes serious eye irritation.

Local effects

0.25 mg Eye irritation test
Result: Severely irritating.
Species: Rabbit
500 mg Skin irritation test
Result: Mildly irritating.
Species: Rabbit

Respiratory or skin sensitization

Respiratory sensitization Knowledge about health hazard is incomplete.

Skin sensitization May cause an allergic skin reaction.

Guinea pig maximization test
Result: Sensitizing.
Local lymph node assay
Result: Sensitizing potential.

Germ cell mutagenicity Knowledge about mutagenicity is incomplete.
Results for genotoxicity and mutagenicity studies were mixed.

Carcinogenicity May cause cancer.

250 - 500 mg/kg Carcinogenicity study
Result: Hemangiosarcomas occurred at all doses.
Species: Mouse
Test Duration: 78 weeks
Carcinogenicity study
Result: Dose dependent incidence of splenic sarcomas and fibrosis observed.
Species: Rat
Test Duration: 2 years

IARC Monographs. Overall Evaluation of Carcinogenicity

p-Chloroaniline (CAS 106-47-8) 2B Possibly carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Knowledge about health hazard is incomplete.

Specific target organ toxicity - single exposure Knowledge about health hazard is incomplete.

Specific target organ toxicity - repeated exposure Knowledge about health hazard is incomplete.

Aspiration hazard Based on available data, the classification criteria are not met.

12. Ecological information

Ecotoxicity

Product		Species	Test Results
p-Chloroaniline (CAS 106-47-8)			
Aquatic			
Crustacea	LC50	Daphnia magna	0.04 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	18 mg/l, 96 hours
		Rainbow Trout	9.7 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste P List: Reference

p-Chloroaniline (CAS 106-47-8) P024

Waste from residues / unused products	Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN2018
UN proper shipping name	Chloroanilines, solid (p-Chloroaniline)
Transport hazard class(es)	
Class	6.1
Subsidiary risk	-
Packing group	II
Packaging exceptions	153
Packaging non bulk	212
Packaging bulk	242

IATA

UN number	UN2018
UN proper shipping name	Chloroanilines, solid (p-Chloroaniline)
Transport hazard class(es)	
Class	6.1
Subsidiary risk	-
Packing group	II
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

DOT; IATA

General information It is the shipper's responsibility to determine the correct transport classification at the time of shipment.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

p-Chloroaniline (CAS 106-47-8) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
p-Chloroaniline	106-47-8	100

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

p-Chloroaniline (CAS 106-47-8)

US. Massachusetts RTK - Substance List

p-Chloroaniline (CAS 106-47-8)

US. New Jersey Worker and Community Right-to-Know Act

p-Chloroaniline (CAS 106-47-8)

US. Pennsylvania RTK - Hazardous Substances

p-Chloroaniline (CAS 106-47-8)

US. Pennsylvania Worker and Community Right-to-Know Law

p-Chloroaniline (CAS 106-47-8)

US. Rhode Island RTK

p-Chloroaniline (CAS 106-47-8)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

p-Chloroaniline (CAS 106-47-8) Listed: October 1, 1994

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 07-01-2008

Revision date 10-31-2016

Version # 06

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