

P-Chloroaniline

Company Information

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SECTION 1: Identification

1.1GHS Product identifier

Product name 4-chloroaniline

1.2Other means of identification

Product number -

Other names Benzenamine,4-chloro; p-Chloroaniline; 4-Aminochlorobenzene

1.3Recommended use of the chemical and restrictions on use

Identified uses Industrial and scientific research use.

Uses advised against no data available

SECTION 2: Hazard identification

2.1Classification of the substance or mixture

Acute toxicity - Category 3, Oral

Acute toxicity - Category 3, Dermal

Skin sensitization, Category 1

Acute toxicity - Category 3, Inhalation

Carcinogenicity, Category 1B

Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

2.2GHS label elements, including precautionary statements

Pictogram(s)



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed
H311 Toxic in contact with skin
H317 May cause an allergic skin reaction

H331 Toxic if inhaled
H350 May cause cancer
H410 Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P271 Use only outdoors or in a well-ventilated area.
P203 Obtain, read and follow all safety instructions before use.
P273 Avoid release to the environment.

Response

P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P316 Get emergency medical help immediately.
P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P333+P317 If skin irritation or rash occurs: Get medical help.
P362+P364 Take off contaminated clothing and wash it before reuse.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P318 IF exposed or concerned, get medical advice.
P391 Collect spillage.

Storage

P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.30ther hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
4-chloroaniline	4-chloroaniline	106-47-8	203-401-0	100%

SECTION 4: First-aid measures

4.1Description of necessary first-aid measures

If inhaled

Fresh air, rest. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Refer for medical attention .

4.2Most important symptoms/effects, acute and delayed

Inhalation or ingestion causes bluish tint to fingernails, lips, and ears indicative of cyanosis; headache, drowsiness, and nausea, followed by unconsciousness. Liquid can be absorbed through skin and cause similar symptoms. Contact with eyes causes irritation. (USCG, 1999)

4.3Indication of immediate medical attention and special treatment needed, if necessary

Methylene blue, alone or in combination with oxygen, is indicated as treatment in nitrite-induced methemoglobinemia.

SECTION 5: Fire-fighting measures

5.1Suitable extinguishing media

Water, dry chemical, foam or carbon dioxide

5.2Specific hazards arising from the chemical

Special Hazards of Combustion Products: Irritating and toxic hydrogen chloride and oxides of nitrogen may form in fires. (USCG, 1999)

5.3Special protective actions for fire-fighters

Use water spray, powder, foam, carbon dioxide.

SECTION 6: Accidental release measures

6.1Personal precautions, protective equipment and emergency procedures

Personal protection: P3 filter respirator for toxic particles and chemical protection suit. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.2Environmental precautions

Personal protection: P3 filter respirator for toxic particles and chemical protection suit. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3Methods and materials for containment and cleaning up

Removal of chloroaniline from wastewater by electrochemical treatment is discussed.

SECTION 7: Handling and storage

7.1Precautions for safe handling

NO open flames. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Separated from strong oxidants and food and feedstuffs. Storage temperature: ambient.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

MAK: skin absorption (H); sensitization of skin (SH); carcinogen category: 2

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear safety goggles or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Solid. Crystalline.
Colour	White or pale yellow solid.
Odour	SLIGHTLY SWEETISH; CHARACTERISTIC AMINE ODOR
Melting point/freezing point	72.5 °C. Atm. press.:101.3 kPa.
Boiling point or initial boiling point and boiling range	232 °C. Atm. press.:101.3 kPa.
Flammability	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit/flammability limit	no data available
Flash point	120 °C. Atm. press.:101.3 kPa.
Auto-ignition temperature	685°C
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available

Solubility	Miscible with water
Partition coefficient n-octanol/water	log Pow = 1.83. Temperature:25 °C.
Vapour pressure	0.15 mm Hg. Temperature:25 °C.;10 mm Hg. Temperature:102.1 °C.;40 mm Hg. Temperature:°C.
Density and/or relative density	1.169. Temperature:77 °C.
Relative vapour density	4.4 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on burning. This produces toxic and corrosive fumes including hydrogen chloride and nitrogen oxides. Reacts violently with oxidants.

10.2 Chemical stability

Stability during transport: stable.

10.3 Possibility of hazardous reactions

P-CHLOROANILINE is incompatible with oxidizing agents. Also incompatible with acids, acid chlorides, acid anhydrides and chloroformates. Subject to exothermic decomposition during high-temperature distillation. Incompatible with nitrous acid. (NTP, 1992)

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Very vigorous reactions may occur with strong oxidants.

10.6 Hazardous decomposition products

When heated to decomposition it emit toxic fumes of /hydrogen chloride and nitrogen oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 - rat (male) - > 200 - < 480 mg/kg bw.
- Inhalation: LC50 Rat (CrI:CD, male) inhalation 2340 mg PCA/cu m/4 hr (head-only exposure) PCA vapor aerosol mixture: respirable fraction 57-95%
- Dermal: LD50 - cat - 239 mg/kg bw.

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Cancer Classification: Group B2 Probable Human Carcinogen

Reproductive toxicity

no data available

STOT-single exposure

The substance is irritating to the eyes. The substance may cause effects on the red blood cells. This may result in lesions of blood cells and the formation of methaemoglobin. Medical observation is indicated. The effects may be delayed.

STOT-repeated exposure

Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the spleen. Tumours have been detected in experimental animals but may not be relevant to humans. See Notes.

Aspiration hazard

A harmful concentration of airborne particles can be reached quickly when dispersed.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 *Lepomis macrochirus* (Bluegill) 2.4 mg/L/96 hr /Conditions of bioassay not specified in source examined
- Toxicity to daphnia and other aquatic invertebrates: EC50 - *Daphnia magna* - > 0.008 - < 38 ppm - 24 h.
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

The metabolism of 4-chloroaniline by isolated cultures of the soil fungus *fusarium oxysporum schlecht* was studied.

2-amino-5-chlorophenol was positively identified as metabolite of 4-chloroaniline in the isolated soil fungus cultures.

12.3 Bioaccumulative potential

The average BCFs in the whole body of carp exposed to 4-chloroaniline in flow-through experiments (25 deg C, 12 L/hr) for 24 to 336 hr at high (10.4 ug/L) and low (0.30 ug/L) exposure levels were 0.8 and 1.7, respectively(3). Excretion was rapid with depuration rates and half-lives of 0.16/hr and 4.3 hr, respectively(3). Therefore, 4-chloroaniline should not bioconcentrate in fish. Uptake was rapid in static tests (0.20 umol/L, 26 deg C) on zebrafish and a BCF of 8.1 was obtained for 24 hr exposure(4). Elimination was best described by a two compartment first order model(4). After 53 hr of depuration, the concn of 4-chloroaniline in the zebrafish declined to 12.0% of the steady state value. The log BCF in Golden orfe was <1.30 for 3 day exposure(1). The 24-hr log BCF in green alga was 3.08 (dry wt basis(2)) and 2.42 (wt weight basis(1)). A BCF of 13.4 was reported for guppy (*Poecilia reticulata*)(5). According to a classification scheme(6), these BCF values suggest the potential for bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

The Koc for 5 Belgium soils ranged from 230-469(1). The adsorption isotherm was not linear and the exponent in the Freundlich adsorption isotherm averaged 0.70(1). The Koc for 5 German soils ranged from 96 to 1,530 with the Freundlich exponent ranging from 0.92 to 1.23(2). From adsorption studies on three soils with radically different organic carbon and clay contents, it was shown that the percent (14)C labeled 4-chloroaniline that was bound increased with the organic carbon content of the soil and decreased with its clay content(3). Stronger binding at low concns, particularly with the soil of low organic carbon content, suggests that there are a limited number of available binding sites on the soil(3). At the lower concn (5ppm), percent binding ranged from 46-78%(3). The Koc to colloidal organic matter in ground water was high, 5,550, suggesting that adsorption onto this microparticulate matter could effectively increase the solubility and leaching of 4-chloroaniline into landfill groundwater(4). According to a classification scheme(5), Koc values between 50-150 suggest that 4-chloroaniline is expected to have high mobility in soil, Koc values >500 to >5000 suggest 4-chloroaniline is expected to have low to no mobility in soil. Aromatic amines are expected to bind strongly to humus or organic matter in soils due to the high reactivity of the aromatic amino group(7,8), suggesting that mobility may be much lower in some soils(SRC). Adsorption of 4-chloroaniline by 5 soils was studied in the lab; adsorption decreased with the depth of the soil sample, due to decreased organic carbon(6). Adsorption coefficients of 4-chloroaniline and 4 other organic compounds for organic and inorganic materials and natural soils were determined(2). With few exceptions, the organic constituents of the soils were mainly responsible for their adsorption properties(2). Cellulose appeared to be a well-suited model adsorbent for simulating the relative adsorption behavior of the chemicals(2). The pKa of 4-chloroaniline is 3.98(9), indicating that this compound will primarily exist in its nonionic form in the environment.

12.50ther adverse effects

no data available

SECTION 13: Disposal considerations

13.1Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1UN Number

ADR/RID: UN2018 (For reference only, please check.)	IMDG: UN2018 (For reference only, please check.)	IATA: UN2018 (For reference only, please check.)
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14.2UN Proper Shipping Name

ADR/RID: CHLOROANILINES, SOLID (For reference only, please check.)	IMDG: CHLOROANILINES, SOLID (For reference only, please check.)	IATA: CHLOROANILINES, SOLID (For reference only, please check.)
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14.3Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please	IMDG: 6.1 (For reference only, please	IATA: 6.1 (For reference only, please
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check.)

check.)

check.)

14.4 Packing group, if applicable

ADR/RID: II (For reference only, please check.) IMDG: II (For reference only, please check.) IATA: II (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
4-chloroaniline	4-chloroaniline	106-47-8	203-401-0
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019

Revision Date July 15, 2019

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit

- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Other Information

Depending on the degree of exposure, periodic medical examination is suggested. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.