SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

Creation Date: Aug 10, 2017

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1. Identification

1.1 GHS Product identifier

Product name	p-toluidine

1.2 Other means of identification

Product number	-
Other names	4-aminotoluene

1.3 Recommended use of the chemical and restrictions on use

Identified uses	For industry use only. Intermediates
Uses advised against	no data available

2. Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Oral, Category 3

Acute toxicity - Dermal, Category 3

Eye irritation, Category 2

Skin sensitization, Category 1

Acute toxicity - Inhalation, Category 3

Carcinogenicity, Category 2

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

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word

Danger

Hazard statement(s)

H301 Toxic if swallowed

H311 Toxic in contact with skin

H319 Causes serious eye irritation

H317 May cause an allergic skin reaction

H331 Toxic if inhaled

H351 Suspected of causing cancer

H400 Very toxic to aquatic life

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.

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.

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P273 Avoid release to the environment.

Response	P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor/⋯
	P321 Specific treatment (see ... on this label).
	P330 Rinse mouth.
	P302+P352 IF ON SKIN: Wash with plenty of water/...
	P312 Call a POISON CENTER/doctor/⋯if you feel unwell.
	P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
	P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P337+P313 If eye irritation persists: Get medical advice/attention.
	P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
	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.
	P311 Call a POISON CENTER/doctor/⋯
	P308+P313 IF exposed or concerned: Get medical advice/ attention.
	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 ...

2.3 Other hazards which do not result in classification

none

3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
p-toluidine	p-toluidine	106-49-0	none	100%

4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest. Artificial respiration may be needed. Refer immediately for medical attention.

In case of skin contact

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

In case of eye contact

Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.

If swallowed

Rinse mouth. Refer immediately for medical attention.

4.2 Most important symptoms/effects, acute and delayed

Absorption of toxic quantities by any route causes cyanosis (blue discoloration of lips, nails, skin); nausea, vomiting, and coma may follow. Repeated inhalation of low concentrations may cause pallor, low-grade secondary anemia, fatigability, and loss of appetite. Contact with eyes causes irritation. (USCG, 1999)

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

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Aniline and related compounds/

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use fine spray or fog to control fire by preventing its spread and absorbing some of its heat. Use water spray, dry chemical, foam, or carbon dioxide. Use water spray to keep fire-exposed containers cool.

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: Toxic and flammable vapors may form in fire. (USCG, 1999)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Approach release from upwind. Stop or control the leak, if this can be done without undue risk. Use water spray to cool and disperse vapors and protect personnel. Control runoff and isolate discharged material for proper disposal.

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7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Provision to contain effluent from fire extinguishing. Separated from strong oxidants, strong acids and food and feedstuffs. Well closed. Ventilation along the floor. Keep in the dark. Store in an area without drain or sewer access.Store in cool, dry, well-ventilated location. Store away from heat, oxidizers, and sunlight.

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8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

NIOSH considers p-toluidine to be a potential occupational carcinogen.

NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concentration.

Biological limit values

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9. Physical and chemical properties

Physical state	white lustrous plates or leaflets with an amine odour
Colour	Lustrous plates or leaflets
Odour	Aromatic, wine-like odor
Melting point/ freezing point	206°C(lit.)
Boiling point or initial boiling point and boiling range	130°C/2mmHg(lit.)
Flammability	Combustible SolidCombustible. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit / flammability limit	no data available
Flash point	140°C(lit.)
Auto-ignition temperature	481.67°C (USCG, 1999)
Decomposition temperature	no data available
pH	no data available

Kinematic viscosity	no data available
Solubility	In water:1.1 g/100 mL
Partition coefficient n-octanol/water (log value)	log Kow = 1.39
Vapour pressure	0.26 mm Hg (25 °C)
Density and/or relative density	0.962
Relative vapour density	3.9 (vs air)
Particle characteristics	no data available

10. Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Flammable when exposed to heat, flame, or oxidizers.As a result of flow, agitation, etc., electrostatic charges can be generated.P-TOLUIDINE neutralizes acids to form salts plus water in exothermic reactions. May be incompatible with isocyanates, halogenated organics, peroxides, phenols (acidic), epoxides, anhydrides, and acid halides. Flammable gaseous hydrogen is generated in combination with strong reducing agents, such as hydrides. Can react vigorously with oxidizing reagents. Emits very toxic fumes of oxides of nitrogen when heated to decomposition. Hypergolic reaction with red fuming nitric acid [Kit and Evered, 1960, p. 239, 242].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Can react vigorously on contact with oxidizing materials.

10.6 Hazardous decomposition products

When heated to decomposition it emits highly toxic fumes of /nitroxides/.

11. Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 656 mg/kg
- Inhalation: LC50 Rat inhalation > 0.64 mg/L for 1 hr
- Dermal: no data available

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

A3; Confirmed animal carcinogen with unknown relevance to humans.

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: Brachydanio rerio (zebrafish); Conditions: static, 21.2-22.8°C, pH 7.8-8.3, oxygen content 7.5-8.5 mg/L, 12 hr daily illumination; Concentration: 115 mg/L for 96 hr
- Toxicity to daphnia and other aquatic invertebrates: EC50; Species: Daphnia magna (water flea); Conditions: semi-static, pH 7.8 +/- 0.1, hardness 250 +/- 25 mg/L CaCO3; Concentration: 0.12 mg/L for 48 hr; Effect: immobilization
- Toxicity to algae: EC50; Species: Scenedesmus subspicatus (algae): Conditions: static Concentration: 22.5 mg/l for 7 days; Effect: growth rate
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: 4-Aminotoluene, present at 100 mg/L, reached 0% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(1), suggesting this compound is not expected to biodegrade rapidly. However, other screening studies(2-8) give contradictory results and show 4-aminotoluene to be readily biodegradable in the environment. Some test results are: 64% of theoretical BOD used in 5 days with a sewage seed(2); 64% of theoretical BOD in 8 days using an activated sludge inoculum acclimated to aniline(3); and 97.7% removal in 5 days with activated sludge(4). When 4-aminotoluene was incubated with sewage, 90 and 100% degradation occurred after 10 and 14 days, respectively(5). Complete degradation was obtained in 4 days with a soil inoculum(6). 500 ppm of 4-aminotoluene completely degraded after 9 days in a Chernozen soil, leaving degradation products that persisted for over 90 days(7). 4-Aminotoluene, present at 2 mg/L, reached 46% of its theoretical BOD in 5 days using water from the Songhua River in China as an inoculum(8).

12.3 Bioaccumulative potential

A BCF of <1.3 was measured for 4-aminotoluene, using orange-red killifish (Oryzias latipes) which were exposed over an 8-week period(1). According to a classification scheme(2), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

The mean Koc of 4-aminotoluene to 4 silt loam soils was 79 at a pH range of 6.1 to 7.5 where 4-aminotoluene is predominantly un-ionized(1). At lower pH, electrostatic forces should play a larger role. Three other soils had Koc values of

323, 496, and 508 where the pH was 4.0, 4.3, and 5.9, respectively(2). In this case appreciable concentrations of 4-aminotoluene would be present in both the neutral and protonated forms. The isotherms were linear and the adsorption constant was highly correlated with the clay content of the soil(2). The mean Koc of 4-aminotoluene in 3 soils (silt, silt loam, loam) was 141 over a pH range of 5.2 to 7.4(3). According to a classification scheme(4), these Koc values suggest that 4-aminotoluene is expected to have high to moderate mobility in soil. The pKa of 4-aminotoluene is 5.10(5), indicating that this compound will partially exist in cation form in the environment and cations generally adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(6). 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).

12.5 Other adverse effects

no data available

13. Disposal considerations

13.1 Disposal 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.

14. Transport information

14.1 UN Number

ADR/RID: UN3451 IMDG: UN3451 IATA: UN3451

14.2 UN Proper Shipping Name

ADR/RID: TOLUIDINES, SOLID

IMDG: TOLUIDINES, SOLID
IATA: TOLUIDINES, SOLID

14.3 Transport hazard class(es)

ADR/RID: 6.1 IMDG: 6.1 IATA: 6.1

14.4 Packing group, if applicable

ADR/RID: II IMDG: II IATA: II

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 Annex II of MARPOL 73/78 and the IBC Code

no data available

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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
p-toluidine	p-toluidine	106-49-0	none
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.

16. Other information

Information on revision

Creation Date	Aug 10, 2017
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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/
