Chemical Safety Data Sheet MSDS / SDS

Aniline SDS

Revision Date:2024-04-25 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: Aniline

CAS: 62-53-3

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.

Uses advised against: none

Company Identification

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

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SECTION 2: Hazards identification

Classification of the substance or mixture

Acute toxicity - Category 3, Oral
Acute toxicity - Category 3, Dermal

Serious eye damage, Category 1
Skin sensitization, Category 1
Acute toxicity - Category 3, Inhalation
Germ cell mutagenicity, Category 2
Carcinogenicity, Category 2
Specific target organ toxicity – repeated exposure, Category 1
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed
H311 Toxic in contact with skin
H318 Causes serious eye damage
H317 May cause an allergic skin reaction
H331 Toxic if inhaled
H341 Suspected of causing genetic defects
H351 Suspected of causing cancer
H372 Causes damage to organs through prolonged or repeated exposure
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/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.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
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.
P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P317 Get medical help.
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.
P319 Get medical help if you feel unwell.
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.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	Aniline
Common names and synonyms:	Aniline
CAS number:	62-53-3

EC number:	200-539-3
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Administration of oxygen may be needed. Refer immediately for medical attention. See Notes.

Following skin contact

Administration of oxygen may be needed. Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer immediately for medical attention. See Notes.

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

Administration of oxygen may be needed. Rinse mouth. Do NOT induce vomiting. Rest. Refer immediately for medical attention. See Notes.

Most important symptoms/effects, acute and delayed

It is classified as very toxic. Probable oral lethal dose in humans is 50-500 mg/kg for a 150 lb. person. Aniline poisoning is characterized by methemoglobin formation in the blood and resulting cyanosis or blue skin. The formation of methemoglobin interferes with the oxygen-carrying capacity of the blood. The approximate minimum lethal dose for a 150 lb. human is 10 grams. Serious poisoning may result from ingestion of 0.25 mL. People at special risk include individuals with glucose-6-phosphate-dehydrogenase deficiency and those with liver and kidney disorders, blood diseases, or a history of alcoholism. (EPA, 1998)

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

SECTION 5: Firefighting measures

Suitable extinguishing media

Use alcohol foam extinguishers. Vapors are heavier than air and will collect in low areas. Vapors may travel long distances to ignition sources and flashback. Vapors in confined areas may explode when exposed to fire. Storage containers and parts of containers may rocket great distances, in many directions. If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated waters. Notify local health and fire officials and pollution control agencies. Fight fire from maximum distance. Dike fire control water for later disposal and do not scatter material. If a leak or spill has not ignited, use water spray to control vapors. From a secure, explosion-proof location, use water spray to cool exposed containers. If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure position ... The only respirators recommended for fire fighting are self-contained breathing apparatuses that have full facepieces and are operated in a pressure-demand or other positive-pressure mode.

Specific hazards arising from the chemical

Combustion can produce toxic fumes including nitrogen oxides and carbon monoxide. Aniline vapor forms explosive mixtures with air. It is incompatible with strong oxidizers and strong acids and a number of other materials. Avoid heating. Hazardous polymerization may occur. Polymerizes to a resinous mass. (EPA, 1998)

Special protective actions for fire-fighters

Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

Wear breathing apparatus, eye protection, laboratory coat, and butyl rubber gloves. Cover the spill with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, clay cat litter (bentonite), and sand. When the aniline has been absorbed, scoop the mixture into a plastic pail and add enough water to dissolve the sodium carbonate. Allow the solids to settle and decant the liquid to another container. Discard the solids with the normal refuse. To the liquidd, slowly (frothing will occur) add 6 M sulfuric acid to pH 2. Stir into the acidified solution sufficient solid potassium permanganate so that the liquid is purple (a drop of the liquid on filter paper will show a purple ring). Allow the mixture to stand at room temperature for 48 hours, and then neutralize with solid sodium carbonate (frothing will occur), or with a 10% aqueous solution of sodium hydroxide. Add solid sodium bisulfite until the solution is colorless. Decant the clear liquid into the drain and discard any brown solid with normal refuse.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames. NO contact with oxidizing agents. Above 76°C use a closed system and ventilation. 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.

Conditions for safe storage, including any incompatibilities

Separated from strong oxidants, strong acids and food and feedstuffs. Well closed. Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.Aniline is slightly corrosive to some types of metal. So all amphoteric materials such as aluminum, copper, tin, zinc, and alloys containing one of these metals (brass, bronze) are not suitable for the handling of aniline, as they are corroded by it. For normal applications carbon steel or cast iron are appropriate materials for the aniline handling or storage. Only if discoloration must be kept to minimum, aniline should be stored and transported in stainless steel equipment with proper nitrogen blanketing.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 2 ppm as TWA; (skin); A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued.MAK: 7.7 mg/m3, 2 ppm; peak limitation category: II(2); skin absorption (H); sensitization of skin (SH); carcinogen category: 4; pregnancy risk group: C; BAT issued

Biological limit values

no data available

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.

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

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Liquid.
Colour:	Colourless.
Odour:	Hedonic tone; pungent
Melting point/freezing point:	-6.2 °C.
Boiling point or initial boiling point and boiling range:	184.4 °C. Atm. press.:1 013 hPa.
Flammability:	Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.
Lower and upper explosion limit/flammability limit:	Lower flammable limit: 1.3% by volume; Upper flammable limit: 11% by volume

Flash point:	76 °C. Atm. press.:1 013 hPa.
Auto-ignition temperature:	630 °C. Atm. press.:1 013 hPa.
Decomposition temperature:	no data available
pH:	8.1 (0.2 molar aq soln)
Kinematic viscosity:	dynamic viscosity (in mPa s) = 4.35. Temperature:20°C.;dynamic viscosity (in mPa s) = 1.62. Temperature:60.0°C.
Solubility:	Miscible with water
Partition coefficient n-octanol/water:	log Pow = 0.91. Temperature:25 °C.
Vapour pressure:	0.4 hPa. Temperature:20 °C.
Density and/or relative density:	1.02. Temperature:20 °C.
Relative vapour density:	3.22 (185 °C, vs air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

NIOSH considers aniline to be a potential occupational carcinogen. [100 ppm]
Decomposes above 190°C . This produces toxic and corrosive fumes of nitrogen oxides and ammonia and flammable vapours.
Reacts with strong acids and strong oxidants. This generates fire and explosion hazard. Attacks copper and its alloys.

Chemical stability

Darkens on exposure to air and light and polymerizes to a resinous mass.

Possibility of hazardous reactions

A combustible liquid when exposed to heat or flame.ANILINE is a heat sensitive base. Combines with acids to form salts. Dissolves

alkali metals or alkaline earth metals with evolution of hydrogen. Incompatible with albumin, solutions of iron, zinc and aluminum, and acids. Couples readily with phenols and aromatic amines. Easily acylated and alkylated. Corrosive to copper and copper alloys. Can react vigorously with oxidizing materials (including perchloric acid, fuming nitric acid, sodium peroxide and ozone). Reacts violently with BCl3. Mixtures with toluene diisocyanate may ignite. Undergoes explosive reactions with benzenediazonium-2-carboxylate, dibenzoyl peroxide, fluorine nitrate, nitrosyl perchlorate, peroxodisulfuric acid and tetranitromethane. Violent reactions may occur with peroxyformic acid, diisopropyl peroxydicarbonate, fluorine, trichloronitromethane (293° F), acetic anhydride, chlorosulfonic acid, hexachloromelamine, (HNO3 + N2O4 + H2SO4), (nitrobenzene + glycerin), oleum, (HCHO + HClO4), perchromates, K2O2, beta-propiolactone, AgClO4, Na2O2, H2SO4, trichloromelamine, acids, FO3Cl, diisopropyl peroxy-dicarbonate, n-haloimides and trichloronitromethane. Ignites on contact with sodium peroxide + water. Forms heat or shock sensitive explosive mixtures with anilinium chloride (detonates at 464 F/7.6 bar), nitromethane, hydrogen peroxide, 1-chloro-2,3-epoxypropane and peroxomonosulfuric acid. Reacts with perchloryl fluoride form explosive products. (NTP, 1992).

Conditions to avoid

no data available

Incompatible materials

It can react vigorously with oxidizing materials ... Spontaneously explosive reactions occur with benzenedazonium-2-carboxylate, dibenzoyl peroxide, fluorine nitrate, nitrosyl perchlorate, red fuming nitric acid, peroxodisulfuric acid, and tetranitromethane. Violent reactions with boron trichloride, peroxyformic acid, diisopropyl peroxydicarbonate, fluorine, trichloronitromethane (145 deg C), acetic anhydride, chlorosulfonic acid, hexachloromelamine, (/nitric acid/ + /dinitrogen tetroxide/ + sulfuric acid), (nitrobenzene + glycerin), oleum, (/formaldehyde/ + /perchloric acid/), perchromates, /potassium peroxide/, beta-propiolactone, /silver perchlorate/, /sodium peroxide/, /sulfuric acid/, trichloromelamine, acids, peroxydisulfuric acid, /perchloryl fluoride/, diisopropyl peroxy-dicarbonate, n-haloimides, and trichloronitromethane. Ignites on contact with sodium peroxide + water. Forms heat- or shock-sensitive explosive mixtures with anilinium chloride (detonates at 240 deg C/7.6 bar), nitromethane, hydrogen peroxide, 1-chloro-2,3-epoxypropane, and peroxomonosulfuric acid. Reactions with perchloryl fluoride, perchloric acid, and ozone form explosive products.

Hazardous decomposition products

The substance decomposes on heating at temperatures above 190 deg C, producing toxic and corrosive fumes (ammonia and nitrogen oxides) and flammable vapors.

SECTION 11: Toxicological information

Acute toxicity

Oral: approximate LD50 - cat (male/female) - >= 102 mg/kg bw.

Inhalation: LC50 - rat - 839 ppm.

Dermal: LD50 - guinea pig, rabbit (male) - 1 316 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

Classification of carcinogenicity: Overall summary evaluation of carcinogenic risk to humans is Group 3: The agent is not classifiable as to its carcinogenicity to humans.

Reproductive toxicity

No information is available on the reproductive or developmental effects of aniline in humans. Birth defects were observed in animals given aniline by gavage (placing the chemical experimentally in the stomachs of the animals). The total number of offspring in mice given aniline by gavage was lower than in the control group even though the average number of offspring per litter was not affected. However, some of the pregnant mice treated with aniline died during pregnancy. Survival of offspring in the aniline-treated group was decreased.

STOT-single exposure

The substance is severely irritating to the eyes. The substance may cause effects on the blood. This may result in the formation of methaemoglobin. See Notes. Exposure could cause haemolysis. This may result in haemolytic anaemia. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the blood. This may result in haemolytic anaemia.

Aspiration hazard

A harmful contamination of the air will be reached on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50 - Oncorhynchus mykiss (previous name: Salmo gairdneri) - 10.6 mg/L - 96 h.

Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna - 0.16 mg/L - 48 h.

Toxicity to algae: EC50 - Chlorella pyrenoidosa - 175 mg/L - 72 h.

Toxicity to microorganisms: EC50 - activated sludge, industrial - 7 mg/L - 2 h.

Persistence and degradability

AEROBIC: Aniline is a benchmark chemical for aerobic biodegradability tests and there are abundant data on its biodegradation. Degradation is frequently 90-100% in laboratory tests utilizing activated sludge or sewage seed lasting from 3 to 28 days with acclimation not always being required(1-14).

Bioaccumulative potential

The measured log BCF for aniline in three species of fish was 0.78(1) and less than 1(2,4). According to a classification scheme(5), these measured BCF values suggests the potential for bioconcentration in aquatic organisms is low(SRC). The log BCF for algae was reported as 0.6(2,3).

Mobility in soil

Primary anilines may bind to soils due to the ability of the aromatic amino group to form covalent bonds with humic and fulvic material in soils(1). The Koc of aniline in 5 European soils was reported in the range of 43.8-497.7(2). The Koc values in 2 silt loams were 130 and 410 with the higher value occurring in the more acidic soil(3). The Koc of aniline in colloidal organic carbon from groundwater (pH 6.5) was reported as 3,870(4). The adsorption constant for adsorption to H-montmorillonite (pH 8.35) and Na-montmorillonite (pH 6.8) is 1,300 and 130(5). The Koc of aniline in 3 silt-clay loams were 269 (pH 4.4), 48 (pH 6.5) and 16 (pH 7.2)(6). A mean Koc value of 55 was determined for aniline in 4 sewage sludges(7). The Koc in five second-generation reference EUROSOILS was 8, 32, 19, 27 and 137(8). According to a classification scheme(9), this Koc data suggests that aniline may have very

high to medium mobility in soil. The pKa of aniline is 4.60(10, indicating that this compound will partially exist in the protonated (cation) form; however, in the pH range between pH5 and pH9, aniline will exist primarily in the non-protonated form; in the protonated form in the environment, cations generally adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(11). In a sorption study using pond sediment from Cherokee Park pond in Athens GA, the sorption kinetics of aniline were characterized by a rapid initial loss of aniline from the aqueous phase followed by a much slower rate of disappearance. The initial sorption was a reversible cation-exchange followed by a slower covalent-binding. It was shown that at pH values greater than the pKa, sorption kinetics were slower than at pH3.75 (rate constants of 4.53-7.95/hr above versus 13.3 below)(12).

Other adverse effects

no data available

SECTION 13: Disposal considerations

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.

SECTION 14: Transport information

UN Number

ADR/RID: UN1547 (For reference only, please check.)
IMDG: UN1547 (For reference only, please check.)
IATA: UN1547 (For reference only, please check.)

UN Proper Shipping Name

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

IATA: ANILINE (For reference only, please check.)

Transport hazard class(es)

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

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.)

Environmental hazards

ADR/RID: Yes
IMDG: Yes
IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

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.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

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

In case of blue lips, fingernails or skin treatment with 100% oxygen may be needed; the appropriate means with instructions must be available.Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.Specific treatment with antidotes like methylene blue can not be used for pregnant women and persons with a G6PD enzyme deficiency. These people should avoid all contact.The odour warning when the exposure limit value is exceeded is insufficient.