Safety Data Sheet

29 Mix primary aromatic amines in acetonitrile

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Report No.：BWQ9672-2016-MSDS-US
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*Prepared according to American OSHA HCS-2024 (29 CFR 1910.1200)

1 Identification

Product identifier

Product Name	29 Mix primary aromatic amines in acetonitrile
Cat No.	BWQ9672-2016
CAS No.	Not applicable
EC No.	Not applicable
Molecular Formula	Not applicable

Recommended use of the product and restrictions on use

Relevant identified uses	Please consult manufacturer.
Uses advised against	Please consult manufacturer.

Details of the supplier of the Safety Data Sheet

Name of the company	Weiyel Inc
Address of the company	Hedian Light Industrial Park, Chengguan Town, Shangcheng County, Xinyang City, Henan Province, China
Post code	465350
Telephone number	010-58103678
Fax number	010-84840368
E-mail address	info@weiyel.com

Emergency phone number

Emergency phone number	010-58103678

2 Hazard(s) identification

Hazard classification according to 29 CFR 1910.1200

Flammable liquids	Category 2
Acute Toxicity - Oral	Category 4
Acute Toxicity - Dermal	Category 4
Serious eye damage/irritation	Category 2
Acute Toxicity - Inhalation	Category 4

Label elements

Hazard pictograms	
Signal word	Danger

Hazard statements

H225	Highly flammable liquid and vapour
H302	Harmful if swallowed
H312	Harmful in contact with skin
H319	Causes serious eye irritation
H332	Harmful if inhaled

Precautionary statements

Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof [electrical/ventilating/lighting] equipment.
P242	Use non-sparking tools.
P243	Take action to prevent static discharges.
P261	Avoid breathing gas/mist/vapour/spray.
P264	Wash hands and other parts of the body (if related) thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or with adequate ventilation.
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Response

P321	Specific treatment (see related instructions on the label).
P330	Rinse mouth.
P302+P352	IF ON SKIN: Wash with plenty of water.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P362+P364	Take off contaminated clothing and wash it before reuse.
P370+P378	Small fire: dry chemical, CO_2 or water spray; Large fire: dry chemical, CO_2 , alcohol-resistant foam or water spray; Fire involving tanks, rail tank cars or highway tanks: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower].
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage

P403+P235	Store in a well-ventilated place. Keep cool.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/ international regulations.

Other hazards

	Not applicable.

Hazard description

◆ Physical and chemical hazards

	Highly flammable liquids, its vapor and air mixture can form explosive mixture.

◆ Health hazards

Inhaled	Sore throat. Weakness. Abdominal pain. Laboured breathing. Convulsions. Unconsciousness. Vomiting. Symptoms may be delayed.
Ingestion	(Further see Inhalation).
Skin Contact	Redness.
Eye	Redness. Pain.

◆ Environmental hazards

	Please refer to 12th chapter of SDS.

3 Composition/information on ingredients

Substance/mixture

	Mixture

Component	CAS No.	EC No.	Concentration (wt, %)
Acetonitrile	75-05-8	200-835-2	99.71
p-phenylenediamine	106-50-3	203-404-7	0.01
m-phenylenediamine	108-45-2	203-584-7	0.01
4-methyl-m-phenylenediamine	95-80-7	202-453-1	0.01
4,4'-oxydianiline	101-80-4	202-977-0	0.01
p,p'-Diaminodiphenyl	92-87-5	202-199-1	0.01
4,4'-methylenedianiline	101-77-9	202-974-4	0.01
Aniline	62-53-3	200-539-3	0.01
o-anisidine	90-04-0	201-963-1	0.01
o-toluidine	95-53-4	202-429-0	0.01
4,4'-methylenedi-o-toluidine	838-88-0	212-658-8	0.01
3,3'-dimethoxybenzidine	119-90-4	204-355-4	0.01
4,4'-bi-o-toluidine	119-93-7	204-358-0	0.01
2,6-xylidine	87-62-7	201-758-7	0.01
2,4'-Diaminodiphenylmethane	1208-52-2	-	0.01
4-methoxy-m-phenylenediamine	615-05-4	210-406-1	0.01
2-Methoxy-5-methylaniline	120-71-8	-	0.01

2,4,5-trimethylaniline	137-17-7	205-282-0	0.01
4,4'-thiodianiline	139-65-1	205-370-9	0.01
4-chloroaniline	106-47-8	203-401-0	0.01
2,4-xylidine	95-68-1	202-440-0	0.01
2-naphthylamine	91-59-8	202-080-4	0.01
2,2'-Methylenedianiline	6582-52-1	229-512-4	0.01
Biphenyl-4-ylamine	92-67-1	202-177-1	0.01
4-chloro-o-toluidine	95-69-2	202-441-6	0.01
5-nitro-o-toluidine	99-55-8	202-765-8	0.01
3,3'-dichlorobenzidine	91-94-1	202-109-0	0.01
4-aminoazobenzene	60-09-3	200-453-6	0.01
4,4'-Methylene bis(2-chloroaniline)	101-14-4	-	0.01
o-Aminoazotoluene	97-56-3	-	0.01

4 First-aid measures

Description of first aid measures

General advice	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
Eye contact	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Skin contact	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
Ingestion	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Give plenty of water to drink. Refer for medical attention.
Inhalation	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Protecting of first-aiders	Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent spread of contamination.

Most important symptoms/effects, acute and delayed

1	Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Indication of any immediate medical attention and special treatment needed

1	Treat symptomatically.
2	Symptoms may be delayed.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing media	Small fire: dry chemical, CO_2 or water spray; Large fire: dry chemical, CO_2 , alcohol-resistant foam or water spray; Fire involving tanks, rail tank cars or highway tanks: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers.
Unsuitable extinguishing media	No information available.

Specific hazards arising from the substance or mixture

1	May emit poisonous fumes on fire.
2	Development of hazardous combustion gases or vapor possible in the event of fire.
3	May expansion or decompose explosively when heated or involved in fire.

Special protective equipment and precautions for fire-fighters

1	As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.
2	Fight fire from a safe distance, with adequate cover.
3	Prevent fire extinguishing water from contaminating surface water or the ground water system.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

1	Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
2	Do not touch or walk through spilled material.
3	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
4	Use personal protective equipment,do not breathe gas/mist/vapour/spray.
5	Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
6	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental precautions

1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

1	Do not touch or cross spills.
2	Cover with anti-solvent foam to reduce evaporation.
3	It is recommended that emergency personnel wear positive pressure self-contained breathing apparatus and wear anti-virus suits.
4	Spray water disperses the vapor and dilutes the liquid spill.
5	Do not touch broken containers and spills before putting on appropriate protective clothing.
6	Cut off the source of the leak as much as possible.
7	Keep leaks in a ventilated place.
8	Absorb spilled material in dry sand or inert absorbent. In case of large amount of spillage, contain a spill by bunding.
9	Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.
10	Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container.

7 Handling and storage

Precautions for safe handling

1	Handling is performed in a well ventilated place.
2	Wear suitable protective equipment.
3	Avoid contact with skin and eyes.
4	Keep away from heat/sparks/open flames/ hot surfaces.

Conditions for safe storage, including any incompatibilities

1	Keep containers tightly closed.
2	Keep containers in a dry, cool and well-ventilated place.
3	Keep away from heat/sparks/open flames/hot surfaces.

8 Exposure controls/personal protection

Control parameters

◆Occupational exposure limit values

Component	Country/Region	Limit value - Eight hours		Limit value - Short term	
		ppm	mg/m³	ppm	mg/m³
Acetonitrile	Australia	40	67	60	101
	Canada - Ontario	20	-	-	-
	European Union	40	70	-	-
	New Zealand	40	67	60	101
	USA - ACGIH	20	-	-	-
	USA - NIOSH	20	34	-	-
p-phenylenediamine	Australia	-	0.1	-	-
	Canada - Ontario	-	0.1	-	-
	New Zealand	-	0.1	-	-
	USA - ACGIH	-	0.1	-	-
	USA - NIOSH	-	0.1	-	-
	USA - OSHA	-	0.1	-	-
m-phenylenediamine	Australia	-	0.1	-	-
	Canada - Ontario	-	0.1	-	-
	New Zealand	-	0.1	-	-
	USA - ACGIH	-	0.1	-	-
	Belgium	-	0.1	-	-
	Canada - Québec	-	0.1	-	-
4-methyl-m-phenylenediamine	Austria	0.02	0.1	0.08	0.4
	Poland	-	0.04	-	0.1
	Romania	1	5	2	10
	Switzerland	0.02	0.1	-	-
p,p'-Diaminodiphenyl	France	0.001	0.008	-	-
	Hungary	-	0.008	-	-
	Italy	-	-	0.001	-
4,4'-methylenedianiline	Australia	0.1	0.81	-	-
	Canada - Ontario	-	0.04	-	-
	European Union	-	0.08	-	-

	New Zealand	0.002	0.0016	-	-
	USA - ACGIH	0.1	-	-	-
	USA - OSHA	0.01	-	0.1	-
Aniline	Australia	2	7.6	-	-
	Canada - Ontario	2	-	-	-
	European Union	2	7.74	5	19.35
	New Zealand	1	4	2	8
	USA - ACGIH	2	-	-	-
	USA - OSHA	5	19	-	-
o-anisidine	Australia	0.1	0.5	-	-
	Canada - Ontario	-	0.5	-	-
	New Zealand	0.1	0.5	-	-
	USA - ACGIH	-	0.5	-	-
	USA - NIOSH	-	0.5	-	-
	USA - OSHA	-	0.5	-	-
o-toluidine	Australia	2	8.8	-	-
	Canada - Ontario	2	-	-	-
	European Union	0.1	0.5	-	-
	New Zealand	0.2	0.89	-	-
	USA - ACGIH	2	-	-	-
	USA - OSHA	5	22	-	-
4,4'-methylenedi-o-toluidine	Austria	-	0.05	-	0.2
	Switzerland	-	0.05(inhalable aerosol)	-	-
3,3'-dimethoxybenzidine	Austria	0.003	0.03	0.012	0.12
	Poland	-	0.2	-	-
	South Korea	-	0.01	-	-
	Switzerland	0.003	0.03	-	-
4,4'-bi-o-toluidine	USA - NIOSH	-	-	-	0.02
	Austria	0.003	0.03	0.012	0.12
	Poland	-	0.03	-	-
2,6-xylidine	Denmark	0.5	2.5	1	5
	Finland	5	25	10	50
	Ireland	0.5	2.5	-	-
	Norway	1	5	-	-
	Singapore	0.5	2.5	-	-
2-Methoxy-5-methylaniline	Austria	-	0.5	-	2
	Switzerland	-	0.5	-	-

4-chloroaniline	Austria	0.04	0.2	0.12	0.8
	Germany (AGS)	0.06	0.3	0.12	0.6
	Hungary	-	0.2	-	0.8
	Poland	-	3	-	10
	Romania	-	2	-	5
	Switzerland	0.04	0.2(inhalable aerosol)	-	-
2,4-xylidine	Austria	5	25	20	20
	Denmark	0.5	2.5	1	5
	Finland	5	25	10	50
	Ireland	0.5	2.5	-	-
	Norway	1	5	-	-
	Singapore	0.5	2.5	-	-
2-naphthylamine	France	0.001	0.005	-	-
	Hungary	-	0.005	-	-
	Italy	-	-	-	0.001
Biphenyl-4-ylamine	France	0.001	0.007	-	-
	Hungary	-	10	-	-
	Italy	-	-	-	0.001
	Poland	-	0.001	-	-
5-nitro-o-toluidine	Canada - Ontario	-	1	-	-
	USA - ACGIH	-	1(inhalable fraction and vapor)	-	-
	Austria	-	0.5	-	2
	Belgium	-	1	-	-
	Ireland	-	1	-	-
	Switzerland	0.08	0.5	-	-
3,3'-dichlorobenzidine	Austria	0.003	0.03	0.012	0.12
	Hungary	-	0.03	-	-
	Switzerland	0.003	0.03	-	-
4,4'-Methylene bis(2-chloroaniline)	Australia	0.02	0.22	-	-
	Canada - Ontario	0.0005	0.005	-	-
	European Union	-	0.01	-	-
	New Zealand	-	0.005	-	-
	USA - ACGIH	0.01(inhalable fraction and vapor)	-	-	-
	USA - NIOSH	-	0.003	-	-

| Engineering controls

1	Ensure adequate ventilation, especially in confined areas.
2	Ensure that eyewash stations and safety showers are close to the workstation location.
3	Use explosion-proof electrical/ventilating/lighting/equipment.
4	Set up emergency exit and necessary risk-elimination area.

Personal protection equipment

General requirement	
Eye protection	Must wear appropriate safety goggles.
Hand protection	Must wear anti static chemical protective gloves.
Respiratory protection	Must wear appropriate personal respiratory protective equipment.
Skin and body protection	Must wear anti static chemical protective clothing and anti static shoes.

9 Physical and chemical properties and safety characteristics

Physical and chemical properties

Appearance (physical state, color, etc.)	yellow or brown liquid
Odor	No information available
Odor threshold	No information available
pH	No information available
Melting point/freezing point(°C)	-46 (Acetonitrile)
Initial boiling point and boiling range(°C)	82 (Acetonitrile)
Flash point(Closed cup,°C)	2 (Acetonitrile)
Evaporation rate	No information available
Flammability	No information available
Upper/lower explosive limits[%(v/v)]	Upper limit：17 (Acetonitrile)；Lower limit：3 (Acetonitrile)
Vapor pressure	9.9kPa (25°C,Acetonitrile)
Vapor density(Air = 1)	1.4 (Acetonitrile)
Relative density(Water=1)	0.8 (Acetonitrile)
Solubility	1000000mg/L (25 °C,Acetonitrile)
n-octanol/water partition coefficient	-0.3 (Acetonitrile)
Auto-ignition temperature(°C)	524 (Acetonitrile)
Decomposition temperature(°C)	No information available
Kinematic viscosity	No information available

10 Stability and reactivity

Stability and reactivity

Reactivity	Contact with incompatible substances can cause decomposition or other chemical reactions.
Chemical stability	Stable under proper operation and storage conditions.

Possibility of hazardous reactions	In contact with N-halogen compounds may cause a potensive explosive hazardous. In contact with oxidants, anhydrides, metals, metal oxides / KMnO4 metal salts, nitro-compounds may cause a fire or explosion.
Conditions to avoid	Incompatible materials, heat, flame and spark.
Incompatible materials	N - halogenated compounds, sulfuric acid and strong oxidants. Oxidants, halogen, anhydrides, acids, metals, metal oxides, potassium permanganate, nitro-compounds and metal salts.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 Toxicological information

Acute toxicity

Component	LD_{50}(oral)	LD_{50}(dermal)	LC_{50}(inhalation,4h)
p-phenylenediamine	80mg/kg(Rat)	No information available	0.92.mg/L(Rat)
2,4-xylidine	467mg/kg(Rat)	No information available	No information available
2-naphthylamine	727mg/kg(Rat)	No information available	No information available
Acetonitrile	2460mg/kg(Rat)	> 2000mg/kg(Rabbit)	4.748mg/L(Rabbit)
o-toluidine	670mg/kg(Rat)	3260mg/kg(Rabbit)	3.778mg/L(Rat)
m-phenylenediamine	280mg/kg(Rat)	No information available	No information available
2-Methoxy-5-methylanilin e	1450mg/kg(Rat)	No information available	No information available
2,6-xylidine	840mg/kg(Rat)	No information available	No information available
p,p'-Diaminodiphenyl	309mg/kg(Rat)	No information available	No information available
4-chloro-o-toluidine	1058mg/kg(Rat)	No information available	No information available
o-anisidine	1150mg/kg(Rat)	No information available	No information available
4-methoxy-m-phenylened iamine	460mg/kg(Rat)	No information available	No information available
4-chloroaniline	300mg/kg(Rat)	360mg/kg(Rabbit)	2.34mg/L(Rat)
4,4'-thiodianiline	900mg/kg(Rat)	No information available	No information available
Biphenyl-4-ylamine	500mg/kg(Rat)	No information available	No information available
4,4'-Methylene bis(2-chloroaniline)	1140mg/kg(Rat)	> 5000mg/kg(Rabbit)	No information available
4,4'-oxydianiline	725mg/kg(Rat)	No information available	No information available
Aniline	250mg/kg(Rat)	837mg/kg(Rabbit)	No information available
4,4'-methylenedianiline	517mg/kg(Rat)	1000mg/kg(Rat)	No information available
3,3'-dimethoxybenzidine	1920mg/kg(Rat)	No information available	No information available

Carcinogenicity

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP	OSHA Carcinogen List
Acetonitrile	Not Listed	Not Listed	Not Listed
p-phenylenediamine	Category 3	Not Listed	Not Listed
m-phenylenediamine	Category 3	Not Listed	Not Listed

4-methyl-m-phenylenediamine	Category 2B	Category R	Not Listed
4,4'-oxydianiline	Category 2B	Category R	Not Listed
p,p'-Diaminodiphenyl	Category 1	Category K	Listed
4,4'-methylenedianiline	Category 2B	Category R	Not Listed
Aniline	Category 2A(Remark 1)	Not Listed	Not Listed
o-anisidine	Category 2A(Remark 2)	Category R	Not Listed
o-toluidine	Category 1	Category K	Not Listed
4,4'-methylenedi-o-toluidine	Category 2B	Not Listed	Not Listed
3,3'-dimethoxybenzidine	Category 2B	Category R	Not Listed
4,4'-bi-o-toluidine	Category 2B	Category R	Not Listed
2,6-xylidine	Category 2B	Not Listed	Not Listed
2,4'-Diaminodiphenylmethane	Not Listed	Not Listed	Not Listed
4-methoxy-m-phenylenediamine	Category 2B	Not Listed	Not Listed
2-Methoxy-5-methylaniline	Category 2B	Category R	Not Listed
2,4,5-trimethylaniline	Category 3	Not Listed	Not Listed
4,4'-thiodianiline	Category 2B	Category R	Not Listed
4-chloroaniline	Category 2B	Not Listed	Not Listed
2,4-xylidine	Category 3	Not Listed	Not Listed
2-naphthylamine	Category 1	Category K	Listed
2,2'-Methylenedianiline	Not Listed	Not Listed	Not Listed
Biphenyl-4-ylamine	Category 1	Category K	Listed
4-chloro-o-toluidine	Category 2A	Category R	Not Listed
5-nitro-o-toluidine	Category 3	Not Listed	Not Listed
3,3'-dichlorobenzidine	Category 2B	Category R	Listed
4-aminoazobenzene	Category 2B	Not Listed	Not Listed
4,4'-Methylene bis(2-chloroaniline)	Category 1(Remark 3)	Category R	Not Listed
o-Aminoazotoluene	Category 2B	Category R	Not Listed

Remark 1: see also Aniline hydrochloride; Remark 2: see also ortho-Anisidine hydrochloride; Remark 3: Overall evaluation upgraded to Group 1 based on mechanistic and other relevant data

Others

29 Mix primary aromatic amines in acetonitrile	
Skin corrosion/irritation	Based on available data, the classification criteria are not met
Serious eye damage/irritation	Causes serious eye irritation(Category 2)
Skin sensitization	Based on available data, the classification criteria are not met
Respiratory sensitization	Based on available data, the classification criteria are not met
Reproductive toxicity	Based on available data, the classification criteria are not met

STOT-repeated exposure	Based on available data, the classification criteria are not met
Aspiration hazard	Based on available data, the classification criteria are not met
Germ cell mutagenicity	Based on available data, the classification criteria are not met

12 Ecological information

Acute aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
p-phenylenediamine	LC_{50} : 3.9mg/L (96h)(Fish)	EC_{50} : 0.28 mg/L (48h)(Crustaceans)	ErC_{50} : 0.18mg/L (72h)(Algae)
2,4-xylidine	No information available	EC_{50} : 9.9mg/L (48h)(Crustaceans)	ErC_{50} : 28.6mg/L (72h)(Algae)
2-naphthylamine	LC_{50} : 3.9mg/L (96h)(Fish)	EC_{50} : 0.84mg/L (48h)(Crustaceans)	ErC_{50} : 0.50mg/L (72h)(Algae)
4-methyl-m-phenylenediamine	LC_{50} : 1170mg/L (96h)(Fish)	EC_{50} : 15mg/L (48h)(Crustaceans)	ErC_{50} : 9.54mg/L (96h)(Algae)
Acetonitrile	LC_{50} : > 100mg/L (96h)(Fish)	EC_{50} : > 1000mg/L (48h)(Crustaceans)	ErC_{50} : >700mg/L (72h)(Algae)
o-toluidine	LC_{50} : 81.3mg/L (96h)(Fish)	EC_{50} : 16mg/L (48h)(Crustaceans)	ErC_{50} : 29.4mg/L (96h)(Algae)
m-phenylenediamine	LC_{50} :512mg/L (96h)(Fish)	EC_{50} : 2.0mg/L (48h)(Crustaceans)	ErC_{50} : 2.87mg/L (96h)(Algae)
3,3'-dichlorobenzidine	LC_{50} : 0.51mg/L (96h)(Fish)	EC_{50} : 1.9mg/L (48h)(Crustaceans)	ErC_{50} : 1.4mg/L (72h)(Algae)
4,4'-bi-o-toluidine	LC_{50} : 13mg/L (96h)(Fish)	EC_{50} : 4.5mg/L (48h)(Crustaceans)	ErC_{50} : 6.3mg/L (72h)(Algae)
2-Methoxy-5-methylanilin e	LC_{50} : 12.27mg/L (96h)(Fish)	No information available	No information available
2,6-xylidine	LC_{50} :>98mg/L (96h)(Fish)	EC_{50} : 20mg/L (48h)(Crustaceans)	ErC_{50} : >100mg/L (72h)(Algae)
p,p'-Diaminodiphenyl	LC_{50} : 5.88mg/L (96h)(Fish)	EC_{50} : 0.6mg/L (48h)(Crustaceans)	No information available
4,4'-methylenedi-o-toluidi ne	LC_{50} :460mg/L (96h)(Fish)	No information available	No information available
o-anisidine	LC_{50} :200mg/L (96h)(Fish)	EC_{50} : 23mg/L (48h)(Crustaceans)	ErC_{50} : >30mg/L (72h)(Algae)
4-aminoazobenzene	LC_{50} : 0.35mg/L (96h)(Fish)	EC_{50} : 0.46mg/L (48h)(Crustaceans)	ErC_{50} : 2.9mg/L (72h)(Algae)
4-chloroaniline	LC_{50} : 5.8mg/L (96h)(Fish)	EC_{50} : 0.31mg/L (48h)(Crustaceans)	ErC_{50} : 2.6mg/L (96h)(Algae)
4,4'-Methylene bis(2-chloroaniline)	LC_{50} : 0.61mg/L (96h)(Fish)	EC_{50} : 0.92mg/L (48h)(Crustaceans)	ErC_{50} : >0.85mg/L (72h)(Algae)
5-nitro-o-toluidine	LC_{50} : 70mg/L (96h)(Fish)	EC_{50} : 22.5mg/L (48h)(Crustaceans)	ErC_{50} : 15.4mg/L (96h)(Algae)
4,4'-oxydianiline	LC_{50} : 22mg/L (96h)(Fish)	EC_{50} : 0.99mg/L (48h)(Crustaceans)	ErC_{50} : 28mg/L (72h)(Algae)
Aniline	LC_{50} : 27mg/L (96h)(Fish)	EC_{50} : 0.32mg/L (48h)(Crustaceans)	ErC_{50} : 20mg/L (96h)(Algae)
4,4'-methylenedianiline	LC_{50} : 21mg/L (96h)(Fish)	EC_{50} : 2.5mg/L (48h)(Crustaceans)	ErC_{50} : 12mg/L (72h)(Algae)

3,3'-dimethoxybenzidine	LC_{50} : 26mg/L (96h)(Fish)	No information available	ErC_{50} : 14mg/L (72h)(Algae)

Chronic aquatic toxicity

Component	Fish	Crustaceans	Algae or other aquatic plants
p-phenylenediamine	No information available	NOEC : 0.043mg/L(Crustaceans)	NOEC : 0.01mg/L(Algae)
2-naphthylamine	No information available	NOEC : 0.014mg/L(Crustaceans)	NOEC : 0.16mg/L(Algae)
4-methyl-m-phenylenediamine	No information available	NOEC : 0.52mg/L(Crustaceans)	NOEC : 1.0mg/L(Algae)
Acetonitrile	NOEC : 102mg/L(Fish)	NOEC : >960mg/L(Crustaceans)	NOEC : 700mg/L(Algae)
o-toluidine	NOEC : 13mg/L(Fish)	NOEC : 0.013mg/L(Crustaceans)	NOEC : 6.4mg/L(Algae)
m-phenylenediamine	No information available	NOEC : 0.20mg/L(Crustaceans)	NOEC : 10mg/L(Algae)
3,3'-dichlorobenzidine	No information available	NOEC : 0.21mg/L(Crustaceans)	NOEC : 0.15mg/L(Algae)
4,4'-bi-o-toluidine	No information available	NOEC : 0.26mg/L(Crustaceans)	NOEC : 0.45mg/L(Algae)
2,6-xylidine	No information available	NOEC : 2.2mg/L(Crustaceans)	NOEC : 32mg/L(Algae)
o-anisidine	NOEC : 25mg/L(Fish)	NOEC : 0.25mg/L(Crustaceans)	NOEC : 7.5mg/L(Algae)
4-chloroaniline	No information available	NOEC : 0.0032mg/L(Crustaceans)	NOEC : 0.32mg/L(Algae)
4-aminoazobenzene	No information available	NOEC : 0.0071mg/L(Crustaceans)	NOEC : 0.14mg/L(Algae)
4,4'-Methylene bis(2-chloroaniline)	No information available	NOEC : 0.0095mg/L(Crustaceans)	NOEC : 0.54mg/L(Algae)
4,4'-oxydianiline	NOEC : 5mg/L(Fish)	No information available	NOEC : 3.9mg/L(Algae)
Aniline	NOEC : 1.9mg/L(Fish)	NOEC : 0.0063mg/L(Crustaceans)	NOEC : 3.7mg/L(Algae)
4,4'-methylenedianiline	No information available	NOEC : 0.0053mg/L(Crustaceans)	NOEC : 4.0mg/L(Algae)
3,3'-dimethoxybenzidine	No information available	No information available	NOEC : 0.58mg/L(Algae)

Persistence and degradability

Component	Persistence (water/soil)	Persistence (air)
p-phenylenediamine	Low(Half-life = 56 days)	Low(Half-life = 0.12 days)
m-phenylenediamine	Low(Half-life = 56 days)	Low(Half-life = 0.12 days)
4,4'-oxydianiline	High(Half-life = 360 days)	Low(Half-life = 0.13 days)
4,4'-methylenedianiline	Low(Half-life = 14 days)	Low(Half-life = 0.11 days)
o-anisidine	High(Half-life = 360 days)	Low(Half-life = 0.22 days)
o-toluidine	Low(Half-life = 14 days)	Low(Half-life = 0.16 days)
4,4'-methylenedi-o-toluidi	High	High

ne		
3,3'-dimethoxybenzidine	High(Half-life = 360 days)	Low(Half-life = 0.14 days)
4,4'-bi-o-toluidine	Low(Half-life = 14 days)	Low(Half-life = 0.11 days)
2,6-xylidine	High(Half-life = 360 days)	Low(Half-life = 0.14 days)
2-Methoxy-5-methylanilin e	High(Half-life = 360 days)	Low(Half-life = 0.12 days)
4,4'-thiodianiline	Low(Half-life = 56 days)	Low(Half-life = 0.15 days)
2,4-xylidine	High	High
Biphenyl-4-ylamine	Low(Half-life = 14 days)	Low(Half-life = 0.25 days)
5-nitro-o-toluidine	Low(Half-life = 56 days)	Low(Half-life = 0.83 days)
3,3'-dichlorobenzidine	High(Half-life = 360 days)	Low(Half-life = 0.38 days)
4-aminoazobenzene	Low(Half-life = 56 days)	Low(Half-life = 0.4 days)
4,4'-Methylene bis(2-chloroaniline)	High(Half-life = 360 days)	Low(Half-life = 0.12 days)
o-Aminoazotoluene	Low(Half-life = 56 days)	Low(Half-life = 0.34 days)

Bioaccumulative potential

Component	Bioaccumulative potential	Comments
p-phenylenediamine	Low	BCF=38
m-phenylenediamine	Low	BCF=24
4,4'-oxydianiline	Low	Log Kow=1.36
4,4'-methylenedianiline	Low	BCF=15
o-anisidine	Low	Log Kow=1.18
o-toluidine	Low	Log Kow=1.32
4,4'-methylenedi-o-toluidi ne	Low	Log Kow=3.2761
3,3'-dimethoxybenzidine	Low	Log Kow=1.81
4,4'-bi-o-toluidine	Low	BCF=83
2,6-xylidine	Low	BCF=96.2
2-Methoxy-5-methylanilin e	Low	BCF=4.6
4,4'-thiodianiline	Low	Log Kow=2.18
2,4-xylidine	Low	BCF=10
Biphenyl-4-ylamine	Low	Log Kow=2.8
5-nitro-o-toluidine	Low	Log Kow=1.87
3,3'-dichlorobenzidine	Medium	BCF=940
4-aminoazobenzene	Low	BCF=42.4
4,4'-Methylene bis(2-chloroaniline)	Low	BCF=398
o-Aminoazotoluene	Medium	Log Kow=4.2887

Mobility in soil

Component	log Koc	Remark
Acetonitrile	0.653	
p-phenylenediamine	1.53	20 ℃
m-phenylenediamine	0.70	20 ℃
4,4'-oxydianiline	1.66	25 ℃
4,4'-methylenedianiline	3.848	
o-anisidine	1.512	
o-toluidine	1.68	20 ℃
4,4'-methylenedi-o-toluidine	3.76	20 ℃
3,3'-dimethoxybenzidine	3.160	
4,4'-bi-o-toluidine	3.874	
2,6-xylidine	2.088	
2-Methoxy-5-methylaniline	1.722	
4,4'-thiodianiline	3.695	
2,4-xylidine	2.079	
Biphenyl-4-ylamine	3.228	
5-nitro-o-toluidine	1.931	
3,3'-dichlorobenzidine	3.874	
4-aminoazobenzene	2.723	
4,4'-Methylene bis(2-chloroaniline)	3.57	20 ℃
o-Aminoazotoluene	3.160	

13 Disposal considerations

Disposal considerations

Waste chemicals	Before disposal should refer to the relevant national and local laws and regulation. Recommend the use of incineration disposal.
Contaminated packaging	Containers may still present chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible.
Disposal recommendations	Refer to section waste chemicals and contaminated packaging.

14 Transport information

Label and Mark

Transporting Label	

IMDG-CODE

UN number	1673
UN proper shipping name	PHENYLENEDIAMINES (p-)
Transport hazard class	6.1
Transport subsidiary hazard class	None
Packing group	Ⅲ
Marine pollutant (Yes or no)	No

IATA-DGR

UN number	1673
UN proper shipping name	PHENYLENEDIAMINES (p-)
Transport hazard class	6.1
Transport subsidiary hazard class	None
Packing group	Ⅲ

UN-ADR

UN number	1673
UN proper shipping name	PHENYLENEDIAMINES (p-)
Transport hazard class	6.1
Transport subsidiary hazard class	None
Packing group	Ⅲ

Transport in bulk according to IMO instruments

◆Transport in bulk according to Annex II of MARPOL and the IBC code

Not Available

◆Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Not Available

◆Transport in bulk in accordance with the IGC Code

Not Available

Others

Precautions for transport	Transit should be anti-exposure, rain, high temperature. Strictly prohibited shipping or transportation with acids, alkalis, oxidants, food and food additives etc. Transport vehicles should be equipped with the appropriate variety and quantity of fire equipment and emergency equipment leakage during transport. Before transport, should be preceded by checking whether container integrity, sealing. The transport unit must be placarded and marked in accordance with relevant transporting requirements.

15 Regulatory information

International chemical inventory

Component	A	B	C	D	E	F	G	H	I	J	K	L	M
Acetonitrile	√	√	√	√	√	√	√	√	√	√	√	√	√

p-phenylenediamine	√	√	√	√	√	√	√	√	√	√	√	√	√
m-phenylenediamine	√	√	√	√	√	√	√	√	√	√	√	√	√
4-methyl-m-phenylenediamine	√	√	√	√	√	√	√	√	√	×	√	√	√
4,4'-oxydianiline	√	√	√	×	√	√	√	√	√	×	√	√	√
p,p'-Diaminodiphenyl	√	√	√	×	√	√	×	√	×	×	√	√	√
4,4'-methylenedianiline	√	√	√	√	√	√	√	√	√	√	√	√	√
Aniline	√	√	√	√	√	√	√	√	√	√	√	√	√
o-anisidine	√	√	√	√	√	√	√	√	√	×	√	√	√
o-toluidine	√	√	√	√	√	√	√	√	√	×	√	√	√
4,4'-methylenedi-o-toluidine	√	√	√	×	×	×	×	×	√	×	×	√	√
3,3'-dimethoxybenzidine	√	√	√	√	×	√	√	√	√	×	√	√	√
4,4'-bi-o-toluidine	√	√	√	√	√	√	√	√	√	×	√	√	√
2,6-xylidine	√	√	√	√	√	√	√	√	√	×	√	√	√
2,4'-Diaminodiphenylmethane	√	√	√	√	√	√	√	√	√	×	×	√	√
4-methoxy-m-phenylenediamine	×	√	√	√	√	×	√	√	√	×	√	√	√
2-Methoxy-5-methylaniline	√	√	√	×	×	√	√	×	√	√	×	√	√
2,4,5-trimethylaniline	×	√	×	×	×	×	×	×	×	×	×	√	√
4,4'-thiodianiline	√	√	√	×	×	×	√	×	√	×	×	√	√
4-chloroaniline	√	√	√	√	√	√	√	√	√	×	√	√	√
2,4-xylidine	√	√	√	×	√	√	√	√	√	×	√	√	√
2-naphthylamine	√	√	×	√	√	√	√	×	×	×	√	√	√
2,2'-Methylenedianiline	√	√	√	×	×	×	×	√	×	×	×	√	√
Biphenyl-4-ylamine	√	√	√	×	√	√	√	×	×	×	√	√	√
4-chloro-o-toluidine	×	√	√	×	×	×	×	√	√	×	×	√	√
5-nitro-o-toluidine	√	√	√	×	×	√	√	√	√	×	√	√	√
3,3'-dichlorobenzidine	√	√	√	×	√	√	√	√	√	√	√	√	√
4-aminoazobenzene	√	√	√	√	√	√	√	√	√	×	√	√	√
4,4'-Methylene bis(2-chloroaniline)	√	√	√	√	√	√	√	√	√	×	√	√	√
o-Aminoazotoluene	√	√	√	√	√	√	√	√	√	×	√	√	√

【A】 China Inventory of Existing Chemical Substances(IECSC)
【B】 European Inventory of Existing Commercial Chemical Substances(EC inventory)
【C】 United States Toxic Substances Control Act Inventory(TSCA)
【D】 Canadian Domestic Substances List(DSL)
【E】 New Zealand Inventory of Chemicals(NZIoC)
【F】 Philippines Inventory of Chemicals and Chemical Substances(PICCS)
【G】 Korea Existing Chemicals Inventory(KECL)
【H】 Australian. Inventory of Industrial Chemical (AIICS)
【I】 Japan Inventory of Existing & New Chemical Substances(ENCS)
【J】 Thailand Existing Chemicals Inventory(TECI)
【K】 Mexico National Inventory of Chemical Substances (INSQ)
【L】 Russia Inventory of Existing Substances(DRAFT)

【M】 Inventory of Existing Chemical Substances in Taiwan, China (TCSI)

List of Chemical Substances under International Conventions

Component	A	B	C
Acetonitrile	×	×	×
p-phenylenediamine	×	×	×
m-phenylenediamine	×	×	×
4-methyl-m-phenylenediamine	×	×	×
4,4'-oxydianiline	×	×	×
p,p'-Diaminodiphenyl	×	×	×
4,4'-methylenedianiline	×	×	×
Aniline	×	×	×
o-anisidine	×	×	×
o-toluidine	×	×	×
4,4'-methylenedi-o-toluidine	×	×	×
3,3'-dimethoxybenzidine	×	×	×
4,4'-bi-o-toluidine	×	×	×
2,6-xylidine	×	×	×
2,4'-Diaminodiphenylmethane	×	×	×
4-methoxy-m-phenylenediamine	×	×	×
2-Methoxy-5-methylaniline	×	×	×
2,4,5-trimethylaniline	×	×	×
4,4'-thiodianiline	×	×	×
4-chloroaniline	×	×	×
2,4-xylidine	×	×	×
2-naphthylamine	×	×	×
2,2'-Methylenedianiline	×	×	×
Biphenyl-4-ylamine	×	×	×
4-chloro-o-toluidine	×	×	×
5-nitro-o-toluidine	×	×	×
3,3'-dichlorobenzidine	×	×	×
4-aminoazobenzene	×	×	×
4,4'-Methylene bis(2-chloroaniline)	×	×	×
o-Aminoazotoluene	×	×	×

【A】 The Montreal Protocol on Substances that Deplete the Ozone Layer
【B】 Stockholm Convention on Persistent Organic Pollutants (POPs)
【C】 Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade

US chemical inventory

Component	A	B	C	D	E	F	G	H
Acetonitrile	√	×	√	√	√	√	√	×
p-phenylenediamine	√	×	√	√	√	√	√	×
m-phenylenediamine	×	×	×	√	√	×	√	×
4-methyl-m-phenylenediamine	√	×	√	√	√	√	√	√
4,4'-oxydianiline	×	×	×	√	√	√	√	√
p,p'-Diaminodiphenyl	√	×	√	√	√	√	√	√
4,4'-methylenedianiline	√	×	√	√	√	√	√	√
Aniline	√	√	√	√	√	√	√	√
o-anisidine	√	×	√	√	√	√	√	√
o-toluidine	√	×	√	√	√	√	√	√
4,4'-methylenedi-o-toluidine	×	×	×	√	√	√	×	√
3,3'-dimethoxybenzidine	√	×	√	√	√	√	√	√
4,4'-bi-o-toluidine	√	×	√	√	√	√	√	√
2,6-xylidine	×	×	×	√	√	√	√	√
2,4'-Diaminodiphenylmethane	×	×	×	×	×	×	×	×
4-methoxy-m-phenylenediamine	×	×	×	√	√	√	√	√
2-Methoxy-5-methylaniline	×	×	×	√	√	√	√	√
2,4,5-trimethylaniline	×	×	×	√	×	×	×	×
4,4'-thiodianiline	×	×	×	√	√	√	√	√
4-chloroaniline	×	×	√	√	√	√	√	√
2,4-xylidine	×	×	×	×	×	×	×	×
2-naphthylamine	×	×	√	√	√	√	√	√
2,2'-Methylenedianiline	×	×	×	×	×	×	×	×
Biphenyl-4-ylamine	√	×	√	√	√	√	√	√
4-chloro-o-toluidine	×	×	×	√	√	√	×	√
5-nitro-o-toluidine	×	×	√	√	√	√	√	×
3,3'-dichlorobenzidine	√	×	√	√	√	√	√	√
4-aminoazobenzene	×	×	×	√	√	√	√	√
4,4'-Methylene bis(2-chloroaniline)	√	×	√	×	√	√	√	√
o-Aminoazotoluene	×	×	×	√	√	√	√	√

[A] US Clean Air Act (CAA)- Section 112, Hazardous Air Pollutants
[B] US SARA 302- Extremely Hazardous Substance List
[C] US CERCLA- Hazardous Substances List
[D] US Massachusetts Right-to-Know Substance List
[E] US New Jersey Right to Know Hazardous Substance List
[F] US Pennsylvania Right to Know Hazardous Substance List

[G] US New York City Right-to-Know Hazardous Substance List
[H] US California Proposition 65 List

Note:
"√" Indicates that the substance included in the regulations.
"×" No data or not included in the regulations.

16 Other information

Information on revision

Creation Date	2025/09/28
Revision Date	-
Reason for revision	-

Reference

[1] IPCS: The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home.
[2] IARC, website: http://www.iarc.fr/.
[3] OECD: The Global Portal to Information on Chemical Substances, website: https://www.echemportal.org/echemportal/.
[4] CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple.
[5] NLM: ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp.
[6] EPA: Integrated Risk Information System, website: http://cfpub.epa.gov/iris/.
[7] U.S. Department of Transportation: ERG, website: http://www.phmsa.dot.gov/hazmat/library/erg.
[8] Germany GESTIS-database on hazard substance, website: http://gestis-en.itrust.de/.

Abbreviations and acronyms

CAS	Chemical Abstracts Service	UN	The United Nations
PC-STEL	Short term exposure limit	OECD	Organization for Economic Co-operation and Development
PC-TWA	Time Weighted Average	IMDG-CODE	International Maritime Dangerous Goods CODE
MAC	Maximum Allowable Concentration	IARC	International Agency for Research on Cancer
DNEL	Derived No Effect Level	ICAO	International Civil Aviation Organization
PNEC	Predicted No Effect Concentration	IATA	International Air Transportation Association
NOEC	No Observed Effect Concentration	ACGIH	American Conference of Governmental Industrial Hygienists
LC_{50}	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD_{50}	Lethal Dose 50%	NTP	National Toxicology Program
EC_{50}	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
EC_X	Effective Concentration X%	vPvB	very Persistent, very Bioaccumulative
P_{OW}	Partition coefficient Octanol: Water	CMR	Carcinogens, mutagens or substances toxic to reproduction
BCF	Bioconcentration factor	RPE	Respiratory Protective Equipment
ED	Endocrine disruptor	HCS	Hazard Communication Standard

Disclaimer

This Safety Data Sheet (SDS) was prepared according to OSHA HCS-2024. The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user's reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.