DIPHENYLAMINE

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
DIPHENYLAMINE

OTHER NAMES

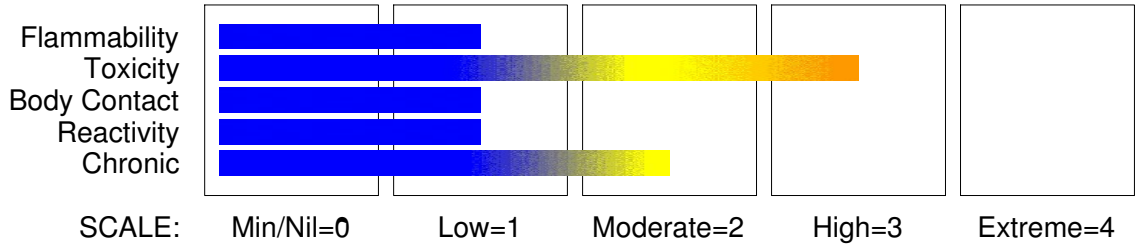
C12-H11-N, C6H5-NH-C6H5, DPA, "aniline, N-phenyl", "aniline, N-phenyl", "N-phenyl aniline", "N-phenyl aniline", anilinobenzene, "benzenamine, N-phenyl(9CI)", "benzene, anilino", "benzene, (phenylamino)-", phenylamino-benzene, "N, N -diphenylamine", "N, N-diphenylamine", N-phenylaniline, N-phenylaniline, N -phenylbenzenamine, N-phenylbenzenamine

PROPER SHIPPING NAME
TOXIC SOLID, ORGANIC, N.O.S.

PRODUCT USE
Used as rubber antioxidants and accelerators; stabiliser for solid propellants and nitrocellulose; in pesticides, dyes, pharmaceuticals, veterinary medicines; storage preservation in apples; in analytical chemistry for the detection of NO2 and ClO3.

SUPPLIER
Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.
technical@sdfine.com
Telephone: 91- 22- 24959898
Telephone: 91- 22- 24959899
Fax: 91- 22- 24937232

HAZARD RATINGS



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 3
Acute Toxicity (Inhalation) Category 3
Acute Toxicity (Oral) Category 3
Chronic Aquatic Hazard Category 1
Organ Damage Category 2
Skin Sensitizer Category 1

EMERGENCY OVERVIEW

HAZARD

DANGER
Determined using GHS criteria:
H331 H311 H301 H317 H373 H410
Toxic if inhaled
Toxic in contact with skin
Toxic if swallowed
May cause allergic skin reaction
May cause damage to organs through prolonged or repeated exposure.
Very toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS

Prevention

Do not breathe dust/fume/gas/mist/vapours/spray.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Wear protective gloves/clothing
Use only outdoors or in a well ventilated area.
Contaminated clothing should not be allowed out of the workplace.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

Response

Immediately call a POISON CENTER or doctor/physician.
Wash contaminated clothing before reuse.
If skin irritation or rash occurs, seek medical advice/attention.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Keep container tightly closed.
Specific treatment: refer to Label or MSDS.
Call a POISON CENTER or doctor/physician if you feel unwell.
Get medical advice/attention if you feel unwell.

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IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
IF ON SKIN: Gently wash with plenty of soap and water.
Wash/Decontaminate removed clothing before reuse.
Remove/Take off immediately all contaminated clothing

Storage

Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
diphenylamine	122-39-4	>98
NOTE: May contain impurities in manufacture as		
2- aminodiphenyl	90-41-5	
4- aminodiphenyl	92-67-1	
aniline	62-53-3	

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.
· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
· For advice, contact a Poisons Information Centre or a doctor.
Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
· Induce vomiting with fingers down the back of the of the throat, ONLY IF CONSCIOUS.
· Lean patient forward or place on left side (head-down position if possible) to maintain open airway and prevent aspiration.
NOTE: Wear a protective glove when inducing vomiting by mechanical means.
· In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
· If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
· If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

If this product comes in contact with the eyes:
· Wash out immediately with fresh running water.
· Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
· If pain persists or recurs seek medical attention.
· Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:

continued...

· Quickly but gently, wipe material off skin with a dry, clean cloth.
· Immediately remove all contaminated clothing, including footwear.
· Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
· Transport to hospital, or doctor.

INHALED

· If dust is inhaled, remove from contaminated area.
· Encourage patient to blow nose to ensure clear passage of breathing.
· If irritation or discomfort persists seek medical attention.
· If fumes or combustion products are inhaled remove from contaminated area.
· Lay patient down. Keep warm and rested.
· Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
· Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
· Transport to hospital, or doctor.

NOTES TO PHYSICIAN

The material may induce methaemoglobinaemia following exposure.
· Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.
· Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
· Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis, alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 50 minutes; repeat, using the same dose, if symptoms of hypoxia fail to subside within 1 hour.
· Thorough cleansing of the entire contaminated area of the body, including the scalp and nails, is of utmost importance.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comment
1. Methaemoglobin in blood	1.5% of haemoglobin	During or end of shift	B, NS, SQ

B: Background levels occur in specimens collected from subjects NOT exposed
NS: Non-specific determinant; also observed after exposure to other materials
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

· Foam.
· Dry chemical powder.
· BCF (where regulations permit).
· Carbon dioxide.
· Water spray or fog - Large fires only.

continued...

FIRE FIGHTING
· Alert Fire Brigade and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.
· Prevent, by any means available, spillage from entering drains or water courses.
· Fight fire from a safe distance, with adequate cover.
· Extinguishers should be used only by trained personnel.
· Use water delivered as a fine spray to control fire and cool adjacent area.
· Avoid spraying water onto liquid pools.
· DO NOT approach containers suspected to be hot.
· Cool fire exposed containers with water spray from a protected location.
· If safe to do so, remove containers from path of fire.
· If fire gets out of control withdraw personnel and warn against entry.
· Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD
· Solid which exhibits difficult combustion or is difficult to ignite.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
· Dry dust can also be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
· Build-up of electrostatic charge may be prevented by bonding and grounding.
· Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.
· All movable parts coming in contact with this material should have a speed of less than 1-metre/sec.
Combustion products include:.
nitrogen oxides (NOx).

FIRE INCOMPATIBILITY
Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Personal Protective Equipment
Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS
· Remove all ignition sources.
· Clean up all spills immediately.
· Avoid contact with skin and eyes.
· Control personal contact by using protective equipment.
· Use dry clean up procedures and avoid generating dust.
· Place in a suitable labelled container for waste disposal.

continued...

MAJOR SPILLS

· Clear area of personnel and move upwind.
· Alert Fire Brigade and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.
· Prevent, by any means available, spillage from entering drains or water course.
· Stop leak if safe to do so.
· Contain spill with sand, earth or vermiculite.
· Collect recoverable product into labelled containers for recycling.
· Neutralise/decontaminate residue.
· Collect solid residues and seal in labelled drums for disposal.
· Wash area and prevent runoff into drains.
· After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
· If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
diphenylamine 125 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
diphenylamine 125 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:
diphenylamine 30 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:
diphenylamine 10 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

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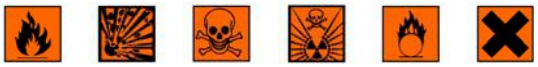
SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X	X	+	X	X	+

+: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

continued...

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

SUITABLE CONTAINER

Packaging as recommended by manufacturer.
- Check that containers are clearly labelled.

Glass container.
Plastic container.
Plastic drum.
Polylined drum.
Metal can.
Metal drum.

STORAGE INCOMPATIBILITY

Avoid reaction with oxidising agents.
Avoid strong acids.
Avoid contact with hexachloramine and trichloramine.
Reacts vigorously with strong acids and explosively with chlorinated melamines.

STORAGE REQUIREMENTS

Observe manufacturer's storing and handling recommendations.
Store in original containers.
Store away from sources of heat or ignition / naked lights.
Store in a well-ventilated area.
Store in a cool, dry place.
Store away from incompatible materials.
Store away from foodstuff containers.
Keep containers securely sealed.
Protect containers against physical damage.
Check regularly for spills and leaks.

continued...

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- diphenylamine: CAS:122- 39- 4
- 2- aminodiphenyl: CAS:90- 41- 5
- 4- aminodiphenyl: CAS:92- 67- 1

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
aniline		100 [Unch]

ODOUR SAFETY FACTOR (OSF)

OSF=0.91 (diphenylamine)
Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.
Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.
The Odour Safety Factor (OSF) is defined as:
OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm
Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

.

MATERIAL DATA

Odour Threshold Value: 0.022-0.025 ppm (recognition)
The TLV has been derived from ingestion studies due to lack of inhalation data. The lowest daily dose that produced no-adverse toxicological effects in female rats was 0.025% dietary diphenylamine fed over 226 days. The no-effect inhalation dose for a 70 kg worker with a respiratory exchange of 10 m3 during an 8 hour workday and 100% absorption was estimated to be 83 mg/m3. The TLV-TWA is thought to be protective against the significant risk of liver, kidney, cardiovascular, haematological and other systemic effects

continued...

INGREDIENT DATA

2-AMINODIPHENYL:

CEL TWA: 0.1 mg/m3 (skin)

Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

4-AMINODIPHENYL:

This compound is one of the most potent of the known bladder carcinogens. Workers exposed to the chemical should be properly equipped to eliminate to the fullest possible extent all exposures.

ANILINE:

Odour Threshold Value: 0.58-10 ppm (detection)

Threshold odour concentration, 50% recognition is >0.1 ppm, identification at 1 ppm.

NOTE: Detector tubes for aniline, measuring in excess of 0.5 ppm are commercially available.

Increased levels of methaemoglobin are detected in the blood of animals exposed at 5 ppm and following skin exposure by humans. The TLV-TWA is thought to provide protection against the significant risk of systemic effects.

PERSONAL PROTECTION




EYE

· Safety glasses.
· Safety glasses with side shields.
· Chemical goggles.
· Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

Rubber gloves.
PVC gloves.

continued...

Butyl rubber gloves.
Safety footwear.
Rubber boots.
PVC boots.

OTHER
· Overalls.
· Barrier cream
· Eyewash unit.

RESPIRATOR

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	AK P1 Air- line*	- -	AK PAPR- P1 -
50 x ES	Air- line**	AK P2	AK PAPR- P2
100 x ES	-	AK P3	-
		Air- line*	-
100+ x ES	-	Air- line**	AK PAPR- P3

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
For further information consult
your
Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to	1: Disturbing room air currents

continued...

capture
2: Contaminants of low toxicity or of nuisance value only.
3: Intermittent, low production.
4: Large hood or large air mass in motion

2: Contaminants of high toxicity
3: High production, heavy use
4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Colourless to greyish crystalline solid in the form of a powder, with a characteristic floral odour. Soluble in carbon disulfide, benzene, alcohol and ether. Insoluble in water.
In the presence of H_2SO_4, turns a deep-blue colour.

PHYSICAL PROPERTIES

Solid.
Does not mix with water.
Sinks in water.

Molecular Weight: 169.23
Melting Range (°C): 52- 55
Solubility in water (g/L): Immiscible
pH (1% solution): Not applicable.
Volatile Component (%vol): Not applicable.
Relative Vapour Density (air=1): 5.82
Lower Explosive Limit (%): Not available.
Autoignition Temp (°C): 634
State: Divided solid

Boiling Range (°C): 302
Specific Gravity (water=1): 1.16 @ 20- 24C
pH (as supplied): Not applicable
Vapour Pressure (kPa): 0.1 @ 100C
Evaporation Rate: Not applicable
Flash Point (°C): 152.7
Upper Explosive Limit (%): Not available.
Decomposition Temp (°C): Not available.
Viscosity: Not available

log Kow: 3.22-3.50
log Kow (Sangster 1997): 0.9
log Kow: 0.90-0.98

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

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Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

EYE
Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
The dust may produce eye discomfort causing transient smarting, blinking.

SKIN
Skin contact with the material may produce toxic effects; systemic effects may result following absorption.
The material is not thought to be a skin irritant (i.e. is unlikely to produce irritant dermatitis as described in EC Directives using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Open cuts, abraded or irritated skin should not be exposed to this material.
Toxic effects may result from skin absorption.
Sensitisation may result in allergic dermatitis responses including rash, itching, hives or swelling of extremities.

INHALED
The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation, of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS
There exists limited evidence that shows that skin contact with the material is capable either of inducing a sensitisation reaction in a significant number of individuals, and/or of producing positive response in experimental animals.
Principal routes of exposure are by accidental skin and eye contact and inhalation of generated dusts.
The material may accumulate in the human body and progressively cause tissue damage.
Prolonged or repeated exposure can cause bladder injury, high pulse rate, hypertension and eczema.
Based on animal tests overexposure may cause reproductive disorders.
Kidney damage produced in newborn offspring of pregnant rats gavaged with technical grade diphenylamine, was subsequently attributed to the presence of the impurity N,N,N'-triphenyl-p-triphenylamine which is occurs in "aged" diphenylamine.

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Histopathological lesions and pathological changes were found in dogs fed on a diet of 1% diphenylamine over 2-years. These included peripherolobular fatty change
in the liver with marked increases in liver weight, a mild haemosiderosis of the spleen, kidneys and bone marrow, and a slight increase in kidney.
Moderate hepatic injury was also demonstrated by a decreased clearance of sulfobromophthalein.
Pure diphenylamine is not, in itself, carcinogenic. However, N-nitroso diphenylamine is a known carcinogen and can be formed directly in the human stomach from diphenylamine and endogenous or dietary inorganic nitrate.
WARNING: This material may contain very low levels of 4-aminobiphenyl impurity which has been classified as a CONFIRMED HUMAN CARCINOGEN. Worker exposure by all routes should be carefully controlled.
The material is not subject to regulation if the 4-aminobiphenyl content is below 0.1%.

TOXICITY AND IRRITATION

TOXICITY	IRRITATION
Oral (rat) LDLo: 3000 mg/kg	

Irritant
ADI: 0.02 mg/kg/day
NOEL: 1.5 mg/kg/day

2-AMINODIPHENYL:

TOXICITY	IRRITATION
Oral (rat) LD50: 2340 mg/kg	Nil Reported
Oral (rabbit) LD50: 1020 mg/kg	

Mouse cell mutagen
NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.

4-AMINODIPHENYL:

TOXICITY	IRRITATION
Oral (rat) LD50: 500 mg/kg	Nil Reported
Oral (rabbit) LD50: 690 mg/kg	

WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.
Tenth Annual Report on Carcinogens: Substance known to be Carcinogenic [National Toxicology Program: U.S. Dep. of Health and Human Services 2002].

ANILINE:

TOXICITY	IRRITATION
Oral (rat) LD50: 250 mg/kg	Skin (rabbit): 500mg/24h- Moderate
Oral (human) LDLo: 350 mg/kg	Eye (rabbit): 102 mg - SEVERE
Inhalation (rat) LCLo: 250 ppm/4h	Eye (rabbit): 20 mg/24h- Moderate
Dermal (rat) LD50: 1400 mg/kg	

The substance is classified by IARC as Group 3:
NOT classifiable as to its carcinogenicity to humans.
Evidence of carcinogenicity may be inadequate or limited in animal testing.
NOTE: The substance is classified under EC Directive on Dangerous Substances (67/548/EEC) : Possible risk of irreversible effects, (substances suspected of being carcinogenic and/or mutagenic).
Exposure to the material for prolonged periods may cause physical defects in the

continued...

developing embryo (teratogenesis).
NOTE: Impure technical grade aniline may also contain toluidines and xylidines which can give increased toxic hazard. Long continued employment in the manufacture of aniline dyes has been associated with the development of papillomatous growths of the bladder, some of which became malignant. Aniline itself has not been proven to be a carcinogen, but the intermediates benzidine and naphthylamines have been incriminated

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant:Not Determined

Half- life Soil - High (hours):	672
Half- life Soil - Low (hours):	168
Half- life Air - High (hours):	2.47
Half- life Air - Low (hours):	0.247
Half- life Surface water - High (hours):	672
Half- life Surface water - Low (hours):	31
Half- life Ground water - High (hours):	1344
Half- life Ground water - Low (hours):	336
Aqueous biodegradation - Aerobic - High (hours):	672
Aqueous biodegradation - Aerobic - Low (hours):	168
Aqueous biodegradation - Anaerobic - High (hours):	2688
Aqueous biodegradation - Anaerobic - Low (hours):	672
Aqueous biodegradation - Removal secondary treatment - High (hours):	99%
Aqueous biodegradation - Removal secondary treatment - Low (hours):	65%
Photolysis maximum light absorption - High (nano- m):	281.5
Photooxidation half- life water - High (hours):	2.47
Photooxidation half- life water - Low (hours):	0.247

log Kow: 3.22-3.50
COD: 90%
ThOD: 2.39
Toxicity Fish: LC50(96)1.3-5.2mg/L
Toxicity invertebrate: LC50(48)0.73-3.65mg/L
Degradation Biological: sig
processes Abiotic: some oxid
Refer to data for ingredients, which follows:

4-AMINODIPHENYL:

Hazardous Air Pollutant:	Yes
Half- life Soil - High (hours):	168
Half- life Soil - Low (hours):	24
Half- life Air - High (hours):	6
Half- life Air - Low (hours):	0.6
Half- life Surface water - High (hours):	168
Half- life Surface water - Low (hours):	24
Half- life Ground water - High (hours):	336
Half- life Ground water - Low (hours):	48
Aqueous biodegradation - Aerobic - High (hours):	168
Aqueous biodegradation - Aerobic - Low (hours):	24
Aqueous biodegradation - Anaerobic - High (hours):	672
Aqueous biodegradation - Anaerobic - Low (hours):	96
Photooxidation half- life water - High (hours):	3480
Photooxidation half- life water - Low (hours):	62.4

continued...

Photooxidation half- life air - High (hours):	6
Photooxidation half- life air - Low (hours):	0.6

ANILINE:

Hazardous Air Pollutant:	Yes
Fish LC50 (96hr.) (mg/l):	134
Daphnia magna EC50 (48hr.) (mg/l):	0.1- 0.65
log Kow (Sangster 1997):	0.9
log Pow (Verschueren 1983):	0.90/0.98

log Kow: 0.90-0.98
Koc: 25.5
Half-life (hr) air: 3.3
Half-life (hr) H2O surface water: 52-520
Henry's Pa m^3 /mol: 0.136
BOD 5 if unstated: 1.42-2.26,62%
COD: 2.4,94%
ThOD: 2.41-3.18
BCF: <148
Log BCF: 0.6-0.78
Toxicity Fish: LC50(96)134mg/L
Toxicity invertebrate: cell mult. inhib. 24-130mg/L
Bioacculmulation: not sig
Nitrif. inhib.: 75% inhib at 2.5-7.7mg/L
Effects on algae and plankton: decr. in BOD,tox-0.4-10mg/L,LD50-20ppm
Degradation Biological: v sig
processes Abiotic: photox-uv in H2O,RxnOH*

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

WASTE DISPOSAL PROCEDURES
• Collect and package recoverable quantities of diphenylamine for recycling or incineration. Dissolve 1g of diphenylamine in 100mL of 3M sulfuric acid. Add 10g
of potassium permanganate in small portions with stirring. Allow to stir overnight. Add solid sodium bisulfite until the solution is colourless. Neutralise with 5% aqueous sodium hydroxide solution and empty the liquid into the drain. Discard any brown recoverable solid with normal refuse [Armour 1996].

SPILLAGE DISPOSAL
• Wear nitrile rubber glove, protective clothing and goggles to control personal
contact from diphenylamine. Cover and contain the spill with a 1:1:1 mixture by weight of soda ash, bentonite and sand. Once all absorbed place the mixture into
a container and transfer to a well ventilated area. Add water to dissolve the sodium carbonate, then add 3M sulfuric acid, until the pH of the solution is 1.

continued...

Add 10g of potassium permanganate for each 1mL of diphenylamine. Stir the contents overnight. Add sodium bisulphite to obtain a colourless solution. Neutralise with 5% aqueous sodium hydroxide solution. Allow the solids to settle. Decant the solution, and empty the liquid portion into the drain. Discard the solids with normal refuse.

Section 14 - TRANSPORTATION INFORMATION

Labels Required: MISCELLANEOUS
HAZCHEM: 2X

UNDG:

Dangerous Goods Class:	9	Subrisk:	None
UN Number:	3077	Packing Group:	III

Shipping Name:ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

IATA:

IATA Class:	9	IMDG Subrisk:	None
UN Number:	3077	Packing Group:	III
EMS Number:	F- A, S- F	Special provisions:	274 909 944
Limited Quantities:	5 kg	Marine Pollutant:	Not Determined

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Maritime Transport IMDG:

IMDG Class:	9	IMDG Subrisk:	None
UN Number:	3077	Packing Group:	III
EMS Number:	F- A, S- F	Special provisions:	274 909 944
Limited Quantities:	5 kg	Marine Pollutant:	Not Determined

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Section 15 - REGULATORY INFORMATION

REGULATIONS

diphenylamine (CAS: 122-39-4) is found on the following regulatory lists;
OECD Representative List of High Production Volume (HPV) Chemicals

continued...

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
aniline	62- 53- 3, 146997- 94- 6, 37342 - 16- 8

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