

PIPERIDINE

GHS Safety Data Sheet

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

PIPERIDINE

OTHER NAMES

C5-H11-N, azocyclohexane, cyclopentimine, cypentil, hexahydropyridine, hexazane, pentamethyleneimine, pentamethylenimine, "pyridine, hexahydro", "piperidene - misspelling"

PROPER SHIPPING NAME

PIPERIDINE

PRODUCT USE

Solvent and intermediate, curing agent for rubber and epoxy resins, catalyst for condensation reactions, ingredient in fuels and oils, complexing agent.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

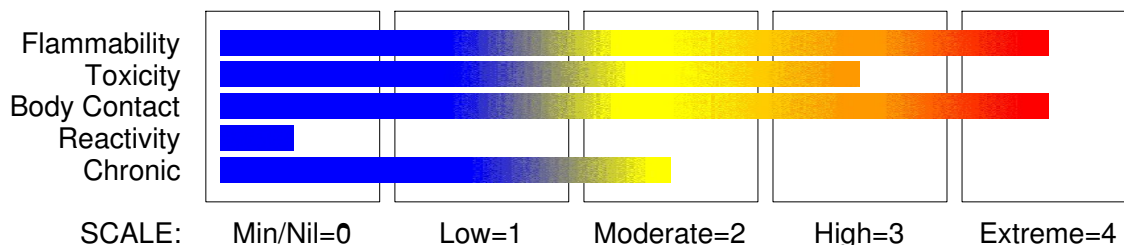
technical@sdfine.com

Telephone: 91- 22- 24959898

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HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 3

Acute Toxicity (Inhalation) Category 2

Acute Toxicity (Oral) Category 2

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Section 2 - HAZARDS IDENTIFICATION

Flammable Liquid Category 2
Metal Corrosion Category 1
Skin Corrosion/Irritation Category 1A



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H225 H330 H300 H311 H290 H314

Highly flammable liquid and vapour

Fatal if inhaled

Fatal if swallowed

Toxic in contact with skin

May be corrosive to metals

Causes severe skin burns and eye damage

PRECAUTIONARY STATEMENTS

Prevention

Ground/bond container and receiving equipment.

Do not breathe dust or mist.

Use only outdoors or in a well ventilated area.

Do not breathe dust/fume/gas/mist/vapours/spray.

Do not eat, drink or smoke when using this product.

Wear protective gloves/clothing and eye/face protection.

Wear protective gloves/clothing

Wash hands thoroughly after handling.

Wash thoroughly after handling.

Wear respiratory protection.

Keep away from heat/sparks/open flame - No smoking.

Wear protective gloves and eye/face protection.

Keep container tightly closed.

Use only non-sparking tools.

Take precautionary measures against static discharge

Use explosion-proof electrical/ventilating/lighting/equipment

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Wash/Decontaminate removed clothing before reuse.

IF ON SKIN: Gently wash with plenty of soap and water.

Immediately call a POISON CENTER or doctor/physician.

Remove/Take off immediately all contaminated clothing

If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.

Wash contaminated clothing before reuse.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

In case of fire, use alcohol-type foam for extinction.

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Section 2 - HAZARDS IDENTIFICATION

Specific treatment: refer to Label or MSDS.
Call a POISON CENTER or doctor/physician if you feel unwell.
Absorb spillage to prevent material damage.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

Storage

Store in a corrosive resistant container with a resistant inliner.
Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
piperidine	110-89-4	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

Rinse mouth out with plenty of water.
For advice, contact a Poisons Information Centre or a doctor.
· If swallowed do NOT induce vomiting.
· If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
· Observe the patient carefully.
· Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
· Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
· Seek medical advice.

EYE

If this product comes in contact with the eyes:
· Immediately hold eyelids apart and flush the eye continuously with 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.
· Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
· Transport to hospital or doctor without delay.
· Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:
· Immediately flush body and clothes with large amounts of water, using safety shower if available.
· Quickly 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 fumes or combustion products are inhaled remove from contaminated area.
· Lay patient down. Keep warm and rested.

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Section 4 - FIRST AID MEASURES

- 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, without delay.

NOTES TO PHYSICIAN

For acute or short-term repeated exposures to highly alkaline materials:

- Respiratory stress is uncommon but present occasionally because of soft tissue edema.
 - Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
 - Oxygen is given as indicated.
 - The presence of shock suggests perforation and mandates an intravenous line and fluid administration.
 - Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.
- Alkalis continue to cause damage after exposure.

INGESTION:

- Milk and water are the preferred diluents
- No more than 2 glasses of water should be given to an adult.
- Neutralising agents should never be given since exothermic heat reaction may compound injury.
 - * Catharsis and emesis are absolutely contra-indicated.
 - * Activated charcoal does not absorb alkali.
 - * Gastric lavage should not be used.

Supportive care involves the following:

- Withhold oral feedings initially.
- If endoscopy confirms transmucosal injury start steroids only within the first 48 hours.
- Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.
- Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).

SKIN AND EYE:

- Injury should be irrigated for 20-30 minutes.
- Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Alcohol stable foam.
- Dry chemical powder.
- Carbon dioxide.
- Water spray or fog - Large fires only.

FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard.

- May be violently or explosively reactive.
 - Wear full body protective clothing with breathing apparatus.
 - Prevent, by any means available, spillage from entering drains or water course.
 - Consider evacuation (or protect in place).
- If safe to do so, switch off electrical equipment until vapour fire hazard is removed.

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Section 5 - FIRE FIGHTING MEASURES

Cool fire exposed containers with water spray from a protected location.
DO NOT approach containers suspected to be hot.
If safe to do so, remove containers from path of fire.

FIRE/EXPLOSION HAZARD

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

On combustion, emits toxic fumes of carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), and minor amounts of cyanides.

FIRE INCOMPATIBILITY

Avoid contamination with strong oxidising agents, particularly peroxides, perchlorates, etc. as violent decomposition / detonation may result.

Personal Protective Equipment

Breathing apparatus.
Chemical splash suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- 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:

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PIPERIDINE

Section 6 - ACCIDENTAL RELEASE MEASURES

piperidine 250 ppm

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

piperidine 6.3199953035 ppm

other than mild, transient adverse effects without perceiving a clearly defined odour is:

piperidine 0.75 ppm

The threshold concentration below which most people will experience no appreciable risk of health effects:

piperidine 0.3 ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
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R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
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R51	$\geq 2.5\%$		
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else	$\geq 10\%$		
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where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X



X



X



X



X



+

+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

DO NOT allow clothing wet with material to stay in contact with skin.

- 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.

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Section 7 - HANDLING AND STORAGE

SUITABLE CONTAINER

- Packing as supplied by manufacturer.
- Plastic containers may only be used if approved for flammable liquid.
- Check that containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

Segregate from strong acids and strong oxidisers.
DO NOT USE brass or copper containers / stirrers.

STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- Keep containers securely sealed.
- Store away from incompatible materials in a cool, dry well ventilated area.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- piperidine: CAS:110- 89- 4

MATERIAL DATA

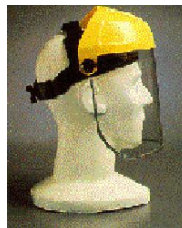
ES TWA: 1 ppm, 3.5 mg/m³

OES TWA: 1 ppm, 3.5 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.

Piperidine odour becomes objectionable above 2 ppm. Systemic toxicity has been reported at 2.87 ppm (10 mg/m³) and subtle changes may occur at 0.57 ppm (2 mg/m³).

PERSONAL PROTECTION



OR

EYE

- Close fitting gas tight goggles.
- Full face shield.
- 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,

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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

- Barrier cream and Butyl rubber gloves or Neoprene gloves.
- PVC gloves.
- Rubber boots.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

RESPIRATOR

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	AK- AUS	-	AK- PAPR- AUS
50 x ES	-	AK- AUS	-
100 x ES	-	AK- 2	AK- PAPR- 2 ^

^ - Full-face.

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

Use in a well-ventilated area.

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	2.5- 10 m/s (500- 2000 f/min.)

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

initial velocity into zone of very high rapid air motion).

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance value only.

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

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 highly flammable liquid; mixes with water.

Heavy amine or peppery like odour.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Alkaline.

Toxic or noxious vapours/gas.

Molecular Weight: 85.17

Melting Range (°C): - 13

Solubility in water (g/L): Miscible

pH (1% solution): Not available

Volatile Component (%vol): Not available

Relative Vapour Density (air=1): 3.0

Lower Explosive Limit (%): 1.15

Autoignition Temp (°C): Not available

State: Liquid

Boiling Range (°C): 106

Specific Gravity (water=1): 0.86

pH (as supplied): Not applicable

Vapour Pressure (kPa): 3.0590 @ 20 C

Evaporation Rate: Not available

Flash Point (°C): 12

Upper Explosive Limit (%): 8.7

Decomposition Temp (°C): Not available

log Kow: 0.84

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Storage in unsealed containers.

- Presence of incompatible materials.
- Product is considered stable.

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PIPERIDINE

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

- Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Considered an unlikely route of entry in commercial/industrial environments.

Ingestion may result in nausea, abdominal irritation, pain and vomiting.

Piperidines produces a pressor effect (blood-pressure increase) and respiratory stimulation in a manner similar to their analogue, nicotine. The piperidine alkaloids (e.g. coniine), extracted from poison hemlock, produce ataxia, salivation, convulsions and coma. Because of structural similarities with nicotine, various mammalian receptors may bind these substances. As a consequence, clinical findings may include initial stimulation (tremor, ataxia, mydriasis), nausea, vomiting, sore throat followed by cardiorespiratory depression (bradycardia, paralysis, coma) and ascending paralysis. Death may result from respiratory failure. Stimulation of nicotinic receptors primarily affects the autonomic ganglia, adrenal medulla, and the motor end-plate of striated muscle; nicotinic agonists primarily produce actions affecting the neuromuscular junctions (producing, for example, fasciculations, weakness and paralysis) and muscarinic effects (producing postganglionic stimulation and, as a result, cardiac inhibition, vasodilation, salivation, lachrymation, bronchoconstriction and gastrointestinal stimulation). In animals, near lethal doses of piperidine may produce increased excitability to sound and touch and cause contraction of the smooth muscle and increased blood pressure. The piperidines may exert an inotropic and chronotropic action on the heart. Large doses block ganglionic conduction. Small doses cause both parasympathetic and sympathetic stimulation due to action on the ganglia. Signs of intoxication include increased blood pressure and heart rate, nausea, vomiting, salivation, laboured breathing, muscular weakness, paralysis and convulsions.

Aliphatic and alicyclic amines are generally well absorbed from the gut. Corrosive action may cause tissue damage throughout the gastrointestinal tract. Detoxification is thought to occur in the liver, kidney and intestinal mucosa with the enzymes, monoamine oxidase and diamine oxidase (histaminase) having a significant role.

EYE

The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.

The material may produce severe irritation to the eye causing pronounced inflammation.

Repeated or prolonged exposure to irritants may produce conjunctivitis.

Vapours of volatile amines cause eye irritation with lachrymation, conjunctivitis and minor transient corneal oedema which results in "halos" around lights (glauropsia). This effect disappears spontaneously within a few hours of the end of exposure, and does not produce physiological after-effects. Although no detriment to the eye occurs as such, glauropsia predisposes an affected individual to physical accidents and reduces the ability to undertake skilled tasks such as driving a vehicle.

Direct local contact with the liquid may produce eye damage which may be permanent in the case of the lower molecular weight species.

PIPERIDINE

Section 11 - TOXICOLOGICAL INFORMATION

SKIN

Skin contact with the material may produce toxic effects; systemic effects may result following absorption.

The material can produce chemical burns following direct contact with the skin.

Toxic effects may result from skin absorption.

The material may accentuate any pre-existing dermatitis condition.

The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

Volatile amine vapours produce primary skin irritation and dermatitis. Direct local contact, with the lower molecular weight liquids, may produce skin burns. Percutaneous absorption of simple aliphatic amines is known to produce lethal effects often the same as that for oral administration. Cutaneous sensitisation has been recorded chiefly due to ethyleneamines. Histamine release following exposure to many aliphatic amines may result in "triple response" (white vasoconstriction, red flare and wheal) in human skin.

INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation.

Inhalation of amine vapours may cause irritation of the mucous membranes of the nose and throat and lung irritation with respiratory distress and cough. Single exposures to near lethal concentrations and repeated exposures to sublethal concentrations produces tracheitis, bronchitis, pneumonitis and pulmonary oedema. Aliphatic and alicyclic amines are generally well absorbed from the respiratory tract. Systemic effects include headache, nausea, faintness and anxiety. These effects are thought to be transient and are probably related to the pharmacodynamic action of the amines. Histamine release by aliphatic amines may produce bronchoconstriction and wheezing.

CHRONIC HEALTH EFFECTS

On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

Principal routes of exposure are usually by skin contact/absorption and inhalation of vapour.

Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS].

Rats and rabbits exposed at 2.87 ppm for 4 hours/day for 4 months, showed alterations in brain electrical activity, cardiovascular system and spermatogenesis, decreased body weight gain and dystrophic changes in liver and kidney. At 0.57 ppm the animals showed decreased arterial pressure, increased permeability of skin capillaries and increased neuromuscular irritability.

Normal human urine from non-smokers contains piperidine in amounts between 3 and 20 mg/litre. The substance produces a pressor effect (blood-pressure increase) and respiratory stimulation in a manner similar to its analogue, nicotine.

In rats exposed to the cold significant rises in the levels of piperidine were observed in the brain and peripheral endocrine glands suggesting a neuroendocrine function.

The substance is found in small amounts in some black peppers.

Clinical symptoms and signs of intoxication following occupational exposure to pyridine, its homologues and derivatives include gastrointestinal disturbance with diarrhoea, abdominal pain and nausea, weakness, headache, insomnia and nervousness. Exposures less

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Section 11 - TOXICOLOGICAL INFORMATION

than those which produce overt clinical signs may produce varying levels of liver damage with central lobular fatty degeneration, congestion and cellular infiltration; repeated low level exposures may produce cirrhosis. The kidney is less sensitive to pyridine-induced damage than is the liver. Pyridine, like primidone, phenobarbital and oxazepam induces liver neoplasms in mice, but not in rats, even though in rats these chemicals cause a spectrum of toxic liver lesions. The mouse, an animal with a high background rate of liver neoplasms, is particularly sensitive to the development of malignant liver neoplasms following chemical exposure. There is equivocal evidence (1) that pyridine is carcinogenic in male F344/N rats (based on an increased incidence of renal tubule neoplasms), in female rats of the same species (based on increases in mononuclear cell leukaemia), in male Wistar rats (based on an increased incidence of mono- nuclear cell leukaemia), and clear evidence of carcinogenicity (1) in male and female B6C3F1 mice (based on increased incidences of malignant hepatocellular neoplasms). 1: National Toxicology Program Technical Report Series No. 470, March 2000.

Secondary amines may react in the acid conditions of the stomach with oxidants or preservatives) to form potentially carcinogenic N-nitrosamines. The formation of nitrosamines from such amines has not only been observed in animals models but, at least for certain compounds, in the workplace. The amine-containing substances and end products handled at work can themselves be contaminated to a degree with corresponding nitrosamines. Under conditions encountered in practice nitrosation is to be expected with secondary amines and to a limited extent with primary and tertiary amines. Nitrogen oxides are the most probable nitrosating agents. Nitrosyl chloride, nitrite esters, metal nitrites and nitroso compounds may also be involved. Several factors such as pH, temperature, catalysts and inhibitors influence the extent of nitrosation. Two precautionary measures are therefore necessary when handling amines at the workplace.

- Simultaneous exposure to nitrosating agents should be reduced to minimum. This can be out into practice by eliminating nitrosating agents or, if they play a role in the actual process, replacing them with substances that do not lead to the formation of carcinogenic nitrosamines. In particular the level of nitrogen oxides at the workplace should be monitored and reduced when necessary.

- The levels of nitrosamines in the workplace and in substances containing amines should be monitored.

Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Report No. 31, DFG, 1995.

TOXICITY AND IRRITATION

TOXICITY

Oral (rat) LD50: 400 mg/kg

Inhalation (rat): LCLo: 4000 ppm/4h

Dermal (rabbit): LD50: 320 mg/kg

Mouse cell mutagen

Reproductive effector in rats.

IRRITATION

Skin (rabbit):0.1 mg/24h (open)

Skin (rabbit):500 mg/24h- SEVERE

Eye (rabbit): 0.25 mg/24h- SEVERE

Section 12 - ECOLOGICAL INFORMATION

log Kow: 0.84

Half-life (hr) air: 81.6

Henry's atm m³ /mol: 4.45E-06

Bioaccumulation: not sig

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Section 13 - DISPOSAL CONSIDERATIONS

- Consult manufacturer for recycling options and recycle where possible .
- Consult State Land Waste Management Authority for disposal.
- Incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE,FLAMMABLE LIQUID
HAZCHEM: 2WE

UNDG:

Dangerous Goods Class: 8
UN Number: 2401
Shipping Name:PIPERIDINE

Subrisk: 3
Packing Group: I

Air Transport IATA:

ICAO/IATA Class: 8
UN/ID Number: 2401
ERG Code: 8F
Shipping name:PIPERIDINE

ICAO/IATA Subrisk: 3
Packing Group: I

Maritime Transport IMDG:

IMDG Class: 8
UN Number: 2401
EMS Number: F- E, S- C
Shipping name:PIPERIDINE

IMDG Subrisk: 3
Packing Group: I

Section 15 - REGULATORY INFORMATION

REGULATIONS

piperidine (CAS: 110-89-4) is found on the following regulatory lists;
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals
United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II
United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control - Table II

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Section 16 - OTHER INFORMATION

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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