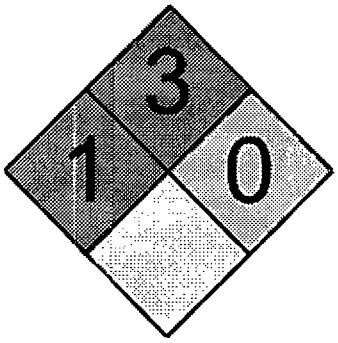
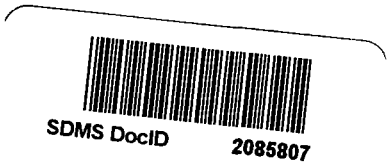
Acetone

CAS RN: 67-64-1

Hazmat - NFPA Hazard Classification





Health: 1 (Slight)
Materials that, on exposure, would cause significant irritation, but only minor residual injury, including those requiring the use of an approved air-purifying respirator. These materials are only slightly hazardous to health and only breathing protection is needed.

Flammability: 3 (Severe)
This degree includes Class IB and IC flammable liquids and materials that can be easily ignited under almost all normal temperature conditions. Water may be ineffective in controlling or extinguishing fires in such materials.

Instability: 0 (Minimal)
This degree includes materials that are normally stable, even under fire exposure conditions, and that do not react with water. Norma fire fighting procedures may be used.

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Acetone

CAS RN: 67-64-1

Key Info

FLAMMABLE LIQUIDS (Polar / Water-Miscible)
- HIGHLY FLAMMABLE: Easily ignited by heat, sparks or flames
- CAUTION: Very low flash point; use of water spray when fighting fire may be inefficient

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Acetone

CAS RN: 67-64-1

Hazmat - Explosive Limits / Potential

Highly flammable liquid. Dangerous disaster hazard due to fire and explosion hazard ...

Upper 12.8%, lower 2.6%.

Vapor may explode if ignited in an enclosed area.

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Acetone

CAS RN: 67-64-1

Hazmat - Reactivities/Incompatibilities

Mixture of acetone & chloroform in a residue bottle exploded. Since addition of chloroform to acetone in presence of a base will result a highly exothermic reaction, it is thought that a base may have been in the bottle.

Acetone may form explosive mixtures with chromic anhydride, chromyl chloride, hexachloromelamine, hydrogen peroxide, nitric acid, acetic acid, nitric acid & sulfuric acid, nitrosyl chloride, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, potassium tert-butoxide, thiodiglycol & hydrogen peroxide.

An explosion occurred during an attempt to prepare bromoform from acetone by the haloform reaction. Acetone ignited when it was accidentally splashed into a sulfuric acid-dichromate solution.

Oxidizers, acids.

Potentially explosive reaction with nitric acid + sulfuric acid, bromine trifluoride, nitrosyl chloride + platinum, nitrosyl perchlorate, chromyl chloride, thiotrithiazyl perchlorate, and (2,4,6-trichloro-1,3,5-triazine + water). Reacts to form explosive peroxide products wi 2-methyl-1,3-butadiene, hydrogen peroxide, and peroxomonosulfuric acid. Ignites on contact with activated carbon, chromium trioxide dioxygen difluoride + carbon dioxide, and potassium-t-butoxide. Reacts violently with bromoform, chloroform + alkalies, bromine, and sulfur dichloride. Incompatible with CrO, (nitric + acetic acid), NOCl, nitryl perchlorate, permonosulfuric acid, NaOBr, (sulfuric acid + potassium dichromate), (thio-diglycol + hydrogen peroxide), trichloromelamine, air, HNO_3, chloroform, and H_2SO_4.

Acetone

CAS RN: 67-64-1

Medical - Health Effects

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

A) Systemic toxicity most commonly occurs after ingestion, inhalation, or, less commonly, after extensive dermal exposure.

B) CNS depression is the most common effect, ranging from sedation and dizziness to loss of consciousness. Respiratory depression and death can occur with significant exposures. The symptomatic patient may need medical supervision for u to 30 hours because of the prolonged elimination half-life of acetone.

C) Nausea, vomiting, headache, excitement, faintness, fatigue, and bronchial irritation may result from inhalation exposure. Extremely high vapor concentrations or splash contact may cause eye discomfort that is usually only transient Acetone vapors are mildly irritating to the eyes and mucous membranes. Prolonged or repeated dermal exposure to liqui acetone can cause defatting and drying of the skin.

D) Seizures may occur.

0.2.1.2 CHRONIC EXPOSURE

A) There have been no reports that prolonged inhalation of low vapor concentrations result in any serious chronic effects in humans.

0.2.5 CARDIOVASCULAR

0.2.5.1 ACUTE EXPOSURE

A) Tachycardia and hypotension have been reported with severe intoxication.

0.2.6 RESPIRATORY

0.2.6.1 ACUTE EXPOSURE

A) Inhalation of highly concentrated vapors may cause respiratory tract irritation. CNS depression from severe exposure by any route may cause respiratory depression.

0.2.7 NEUROLOGIC

0.2.7.1 ACUTE EXPOSURE

A) Effects resemble those of ethanol intoxication, including lethargy, ataxia, lightheadedness, and incoherent speech. Stupor and coma occur with large ingestions.

0.2.8 GASTROINTESTINAL

0.2.8.1 ACUTE EXPOSURE

A) Nausea, vomiting and hematemesis have occurred after extreme dermal and inhalational exposure.

0.2.10 GENITOURINARY

0.2.10.1 ACUTE EXPOSURE

A) Kidney damage may occur.

0.2.11 ACID-BASE

0.2.11.1 ACUTE EXPOSURE

A) Mild metabolic acidosis may develop.

0.2.14 DERMATOLOGIC

0.2.14.1 ACUTE EXPOSURE

A) Skin exposure may lead to erythema and irritation. Acetone dries the skin. Nail brittleness may develop after repeated application.

0.2.17 METABOLISM

0.2.17.1 ACUTE EXPOSURE

A) Hyperglycemia and ketonemia mimicking diabetic ketoacidosis (DKA) have been commonly reported. Hyperglycemia, polyuria and polydipsia may persist for several weeks.

0.2.20 REPRODUCTIVE HAZARDS

A) Acetone has not caused teratogenic effects in mice and rat studies. Spermatogenesis, including sperm morphology, motility, and count, has been observed in rats. Post-implantation mortality has been noted in mammals (species unspecified).

0.2.21 CARCINOGENICITY

0.2.21.1 IARC CATEGORY

A) IARC Carcinogenicity Ratings for CAS67-64-1 (IARC, 2004):

1) Not Listed

0.2.22 GENOTOXICITY

A) Acetone caused sex chromosome loss/nondisjunction in S cerevisiae and was positive on cytogenic analysis in hamster fibroblasts.

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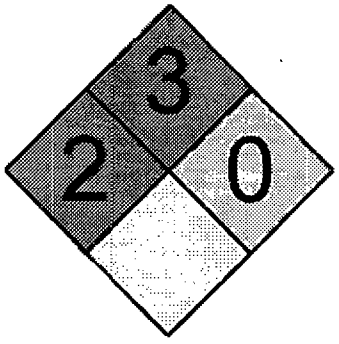
Acetonitrile

CAS RN: 75-05-8

NFPA Hazard Classification



Health: 2 (Moderate)
Materials that, on intense or continued (but not chronic) exposure, could cause temporary incapacitation or possible residual injury, including those requiring the use of respiratory protective equipment that has an independent air supply. These materials are hazardo to health, but areas may be entered freely if personnel are provided with full-face mask self-contained breathing apparatus that provides complete eye protection.

Flammability: 3 (Severe)
This degree includes Class IB and IC flammable liquids and materials that can be easily ignited under almost all normal temperature conditions. Water may be ineffective in controlling or extinguishing fires in such materials.

Instability: 0 (Minimal)
This degree includes materials that are normally stable, even under fire exposure conditions, and that do not react with water. Norma fire fighting procedures may be used.

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Acetonitrile

CAS RN: 75-05-8

Key Info

- TOXIC; may be fatal if inhaled, ingested or absorbed through skin
- HIGHLY FLAMMABLE: Easily ignited by heat, sparks, flames
- CAUTION: Very low flash point; use of water spray when fighting fire may be inefficient

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Glutaraldehyde

CAS RN: 111-30-8

Key Info

- Poisonous gases produced in fire
- Severe eye irritant
- Skin and respiratory system irritant

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Glutaraldehyde

CAS RN: 111-30-8

Hazmat - Reactivities/Incompatibilities

Strong oxidizers, strong bases [Note: Alkaline solutions of glutaraldehyde (i.e., activated glutaraldehyde) react with alcohol, ketones, amines, hydrazines & proteins].

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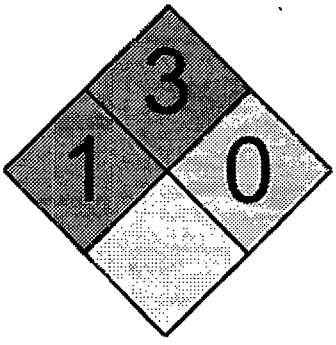
Isopropanol - (alias of Isopropyl Alcohol)

CAS RN: 67-63-0

Hazmat - NFPA Hazard Classification



Health: 1 (Slight)
Materials that, on exposure, would cause significant irritation, but only minor residual injury, including those requiring the use of an approved air-purifying respirator. These materials are only slightly hazardous to health and only breathing protection is needed.

Flammability: 3 (Severe)
This degree includes Class IB and IC flammable liquids and materials that can be easily ignited under almost all normal temperature conditions. Water may be ineffective in controlling or extinguishing fires in such materials.

Instability: 0 (Minimal)
This degree includes materials that are normally stable, even under fire exposure conditions, and that do not react with water. Norma fire fighting procedures may be used.

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Isopropanol - (alias of Isopropyl Alcohol)

CAS RN: 67-63-0

Key Info

FLAMMABLE LIQUIDS (Polar/Water-Miscible/Noxious)
- HIGHLY FLAMMABLE: Easily ignited by heat, sparks, flames
- CAUTION: Very low flash point; use of water spray when fighting fire may be inefficient
- Do not use straight streams

Isopropanol - (alias of Isopropyl Alcohol)

CAS RN: 67-63-0

Hazmat - Fire Potential

A very dangerous fire hazard when exposed to heat, flame or oxidizers.

Ignites on contact with dioxygenyl tetrafluoroborate; chromium trioxide; potassium tert-butoxide... .

Isopropanol - (alias of Isopropyl Alcohol)

CAS RN: 67-63-0

Hazmat - Reactivities/Incompatibilities

During distillation of 2-propanol recovered from the reduction of crotonaldehyde with aluminium isopropoxide, a violent explosion occurred. This was attributed either to peroxidized diisopropyl ether (a possible by-product) or to peroxidized crotonaldehyde.

REACTS VIOLENTLY WITH HYDROGEN-PALLADIUM COMBINATION (H2 + Pd); NITROFORM; OLEUM; COCl2; ALUMINUM TRIISOPROPOXIDE; OXIDANTS.

Two explosions occurred during laboratory distillation of isopropanol, one with a sample stored for 4 yr. No cause was apparent, but presence of traces of ketone(s) promoting peroxidation is a possibility. Previously, the presence of 0.36 molar peroxide had been reported in a 99.5% pure sample of isopropanol stored for several months in a partially full clear glass bottle in strong daylight.

Dissolution of aluminium in 2-propanol to give the isopropoxide is rather exothermic, but often subject to an induction period similar to that in preparation of Grignard reagents.

Addition of a small amount of hydrogen peroxide may reduce sharply the autoignition temp of the alcohol (455 deg C), probably that of the hydroperoxide.

Frozen mixtures of trinitromethane-2-propanol (9:1) exploded during thawing. The former (of positive oxygen balance) dissolve exothermally in the alcohol, the heat effect increasing directly with the concn above 50% wt/wt. Traces of nitric acid may also have been present.

Distillation of mixtures of /barium perchlorate/ with C1-C3 alcohols gives the highly explosive alkyl perchlorates.

Homogeneous mixtures of concentrated peroxide with alcohols or other peroxide miscible organic liquids are capable of detonation by shock or heat.

Secondary alcohols are readily autoxidized in contact with oxygen or air, forming ketones and hydrogen peroxide. A partly full bottle of 2-propanol exposed to sunlight for a long period became 0.36 molar in peroxide and potentially explosive.

Contact of 1.5 g portions of the solid /potassium tert-butoxide/ ... with ... vapors of ... /isopropanol/ caused ignition after ... 1 min.

Solutions of 90% nitroform in 10% isopropyl alcohol in polyethylene bottles exploded.

The reaction between isopropyl alcohol and phosgene forms isopropyl chloroformate and hydrogen chloride. In the presence of iron salts thermal decomposition can occur, which in some cases can become explosive.

A very dangerous fire hazard when exposed to heat, flame or oxidizers.

Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids, isocyanates.

The presence of 2-butanone incr the reaction rate for peroxide formation.

Vigorous reaction with sodium dichromate + sulfuric acid; aluminum (after a delay).

Isopropanol - (alias of Isopropyl Alcohol)

CAS RN: 67-63-0

Medical - Health Effects

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

A) Isopropyl alcohol is generally believed to produce greater CNS depression than ethanol at comparable blood levels. Isopropyl alcohol is toxic by the oral, dermal, parenteral, and inhalation exposure routes. Not all rubbing alcohol contains isopropanol; some contains ethanol. Most rubbing alcohol formulations contain 70 percent isopropanol.
B) Ingestion or inhalation of isopropyl alcohol may result in flushing, headache, dizziness, hallucinations, distorted perceptions, dyspnea, nausea, vomiting, CNS depression, and coma. Respiratory depression, hypotension, bradycardia, and hypothermia may occur with severe overdoses. Tachycardia is common. Ketonemia and ketonuria may be present, generally without metabolic acidosis. Emesis and hemorrhagic gastritis may occur following ingestion.
C) Renal insufficiency with anuria followed by oliguria, nitrogen retention, and edema may be a complication of poisonin

0.2.3 VITAL SIGNS

0.2.3.1 ACUTE EXPOSURE

A) Ingestion, dermal absorption, or inhalation commonly cause tachycardia. Hypothermia, bradycardia, and hypotension may occur with severe poisoning.

0.2.4 HEENT

0.2.4.1 ACUTE EXPOSURE

A) Eye discomfort without significant injury occurs with brief vapor or splash exposure (70 percent solution).
B) Temporary changes in the corneal epithelium may develop after prolonged vapor exposure. Moderate irritation has been produced in animal eye tests.

0.2.5 CARDIOVASCULAR

0.2.5.1 ACUTE EXPOSURE

A) Tachycardia is common. Hypotension and bradycardia may occur in severe poisonings.

0.2.6 RESPIRATORY

0.2.6.1 ACUTE EXPOSURE

A) Respiratory depression and failure can occur in cases of severe poisoning from inhalation, ingestion, or parenteral exposure. Tracheobronchitis may occur.

0.2.7 NEUROLOGIC

0.2.7.1 ACUTE EXPOSURE

A) CNS depression is common, ranging from disorientation and lethargy to coma. Dysarthria, ataxia, and nystagmus may develop. Diminished or absent deep tendon reflexes are common. Seizures and increased CSF protein levels are rare effects.

0.2.8 GASTROINTESTINAL

0.2.8.1 ACUTE EXPOSURE

A) Vomiting and gastritis may occur. Hemorrhagic gastritis and associated anemia may be present.

0.2.10 GENITOURINARY

0.2.10.1 ACUTE EXPOSURE

A) Acute renal tubular necrosis has been reported in patients with hypotension or rhabdomyolysis. Myoglobinuria has be reported.

0.2.11 ACID-BASE

0.2.11.1 ACUTE EXPOSURE

A) Ketosis and ketonuria are common. Significant metabolic acidosis is rare.

0.2.13 HEMATOLOGIC

0.2.13.1 ACUTE EXPOSURE

A) Hemolysis may occur after exposure.

0.2.14 DERMATOLOGIC

0.2.14.1 ACUTE EXPOSURE

A) Dermal irritation and burns may develop from chronic use or prolonged contact. Systemic absorption may occur following dermal application, particularly in infants.

0.2.15 MUSCULOSKELETAL

0.2.15.1 ACUTE EXPOSURE

A) Rhabdomyolysis may occur following exposure.

0.2.16 ENDOCRINE

0.2.16.1 ACUTE EXPOSURE

A) Mild hyperglycemia is often reported in adults. Children may be at greater risk for developing hypoglycemia.

0.2.20 REPRODUCTIVE HAZARDS

A) At the time of this review, no reproductive studies were found for isopropanol in humans.

0.2.21 CARCINOGENICITY

0.2.21.1 IARC CATEGORY

A) IARC Carcinogenicity Ratings for CAS67-63-0 (IARC, 2004):

1) IARC Classification

a) Listed as: Isopropanol manufacture (strong-acid process)

b) Carcinogen Rating: 1

1) The agent (mixture) is carcinogenic to humans. The exposure circumstance entails exposures that are carcinogenic to humans. This category is used when there is sufficient evidence of carcinogenicity in humans. Exceptionally, an agent (mixture) may be placed in this category when evidence of carcinogenicity in humans is less than sufficient but there is sufficient evidence of carcinogenicity in experimental animals and strong evidence in exposed humans that the agent (mixture) acts through a relevant mechanism of carcinogenicity.

2) IARC Classification

a) Listed as: Isopropanol

b) Carcinogen Rating: 3

1) The agent (mixture or exposure circumstance) is not classifiable as to its carcinogenicity to humans. This category is used most commonly for agents, mixtures and exposure circumstances for which the evidence of carcinogenicity is inadequate in humans and inadequate or limited in experimental animals. Exceptionally, agents (mixtures) for which the evidence of carcinogenicity is inadequate in humans but sufficient in experimental anima may be placed in this category when there is strong evidence that the mechanism of carcinogenicity in experimental animals does not operate in humans. Agents, mixtures and exposure circumstances that do not fall

into any other group are also placed in this category.

0.2.21.2 HUMAN OVERVIEW

A) Isopropanol is not regarded as a human carcinogen at the present time.

B) Some studies reported an increased incidence of paranasal, laryngeal and pharynx cancers, but this was felt to be related to other chemicals used in the manufacture of isopropanol using the strong acid method.

0.2.21.3 ANIMAL OVERVIEW

A) Isopropyl alcohol has not been carcinogenic in experimental animals. A slight increase in interstitial testicular cell adenomas following inhalation exposure has been seen.

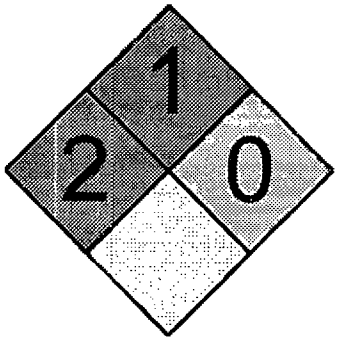
0.2.22 GENOTOXICITY

A) Isopropanol has not been genotoxic in a variety of short-term tests.

Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

NFPA Hazard Classification



Health: 2 (Moderate)
Materials that, on intense or continued (but not chronic) exposure, could cause temporary incapacitation or possible residual injury, including those requiring the use of respiratory protective equipment that has an independent air supply. These materials are hazardo to health, but areas may be entered freely if personnel are provided with full-face mask self-contained breathing apparatus that provides complete eye protection.

Flammability: 1 (Slight)
This degree includes materials that must be preheated before ignition will occur, such as Class IIIB combustible liquids and solids and semi-solids whose flash point exceeds 200 deg F (93.4 deg C), as well as most ordinary combustible materials. Water may cause frothing if it sinks below the surface of the burning liquid and turns to steam. However, a water fog that is gently applied to the surfac of the liquid will cause frothing that will extinguish the fire.

Instability: 0 (Minimal)
This degree includes materials that are normally stable, even under fire exposure conditions, and that do not react with water. Norma fire fighting procedures may be used.

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Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

Key Info

HALOGENATED SOLVENTS
• Vapors may cause dizziness or suffocation

Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

Basic - Major Uses

The active ingredient is no longer contained in any registered pesticide products ... "cancelled."

Chem int for bromochloromethane & other chemicals

In pour molding of dental material, the 50:50 mixture of dichloromethane and methylmethacrylate cold curing monomer is used to tre the acrylic teeth to improve the bonding

Paint stripping, extraction solvent for decaffeination of coffee, spices, and beer hops, dip-type metal cleaner, vapor degreasing of metals, carrier solvent in textile industry, aerosol, refrigerant, low temperature heat-transfer agent. It is used in chemical processing (e.g., manufacture of polycarbonate plastics, insecticides and herbicides, pharmaceuticals. Other uses include grain fumigation and oil dewaxing.

Solvent in paint removers, for cellulose acetate; degreasing and cleaning fluids; as solvent in food processing. Pharmaceutical aid (solvent). Aerosol propellant; insecticide.

Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

Properties - Stability/Shelf Life

In the absence of moisture @ ordinary temp, dichloromethane is relatively stable when compared with its congeners, chloroform and carbon tetrachloride.

At elevated temperatures (300-450 deg C) tends to carbonize when vapor contacts steel and metal chlorides.

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Stored in a mixture with acetone + water in "process water recovery tanks"?

Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

Hazmat - Toxic Combustion Products

Toxic gases and vapors (such as hydrogen chloride, phosgene and carbon monoxide) may be released in a fire involving methylene chloride.

Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

Hazmat - Reactivities/Incompatibilities

Mixtures of /dinitrogen/ tetraoxide with ... dichloromethane ... are explosive when subjected to shock of 25 g TNT equiv or less.

Mixtures of lithium shavings with several halocarbon derivatives are impact sensitive and will explode, sometimes violently. Such materials include: ... dichloromethane ....

Dichloromethane dissolves endothermically in concentrated nitric acid to give a detonable soln.

Contact of 1.5 g portions of the solid /potassium tert-butoxide/ ... with drops of ... dichloromethane caused ignition after ... 2 min.

Prolonged heating with water @ 180 deg C results in formation of formic acid, methyl chloride, methanol, hydrochloric acid & some carbon monoxide.

... Will form explosive mixtures with an atmosphere having a high oxygen content, in liq oxygen, nitrogen tetroxide, potassium, sodiur sodium-potassium alloy.

Contact with strong oxidizers, strong caustics and chemically active metals such as aluminum or magnesium powder, sodium and potassium may cause fires and explosions.

Dichloromethane, previously considered to be nonflammable except in oxygen, becomes flammable in air at 102 deg C/1 bar, @ 27 de C/1.7 bar or @ 27 deg C/1 bar in presence of less than 0.5 vol% of methanol ...

Strong oxidizers; caustics; chemically-active metals such as aluminum, magnesium powders, potassium & sodium; concentrated nitric acid.

Mixtures in air with methanol vapor are flammable. ... Reacts violently with ... (potassium hydroxide + N-methyl-N-nitrosourea).

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Dichloromethane - (alias of Methylene chloride)

CAS RN: 75-09-2

Medical - Health Effects

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Methylene chloride may be absorbed after inhalation, ingestion, or dermal exposure. It is irritating to the eyes, skin, and mucous membranes. Acute exposure may cause narcotic effects. High concentration exposure may resu in CNS depression and respiratory failure.

2) Other signs and symptoms of exposure may include somnolence, euphoria, irritability, fatigue, weakness, alter sleep patterns, numbness and tingling of the extremities, neurasthenic disorders, convulsions, pulmonary edema, change in cardiac rate, nausea, vomiting, anemia, and hemolysis. Acoustical and optical delusions and hallucinations were reported following exposure to methylene chloride for one year.

3) Ingestion may produce gastrointestinal burns, hemorrhage, and necrosis. Dermal contact may cause irritation and burns, and a dry, scaly dermatitis. Liver and kidney damage and pulmonary congestion has been reported in experimental animals following chronic exposure.

4) Methylene chloride is metabolized in part to carbon monoxide and may cause elevations in carboxyhemoglobin rarely as high as 50 percent in severe exposures. Physical exertion increases absorption, conversion to carbon monoxide, and carboxyhemoglobin levels.

5) Combustion of methylene chloride or use around open flames or heated surfaces may produce hydrogen chloride and phosgene. Concentrations in excess of 50,000 ppm are thought to be immediately life-threatening.

0.2.1.2 CHRONIC EXPOSURE

A) Studies of the chronic effects of methylene chloride (especially of its carcinogenesis and neurotoxicity) have produced overwhelmingly negative results.

0.2.4 HEENT

0.2.4.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Exposure to fumes causes eye irritation. Direct contact or immersion may cause burns to the cornea or oral mucosa.

0.2.5 CARDIOVASCULAR

0.2.5.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Methylene chloride may cause occupational heart disease. Inhalation of methylene chloride may exacerbate angina in persons with pre-existing cardiac disease.

2) Angina, myocardial infarction, and cardiac arrest associated with methylene chloride inhalation developed in on patient. Hypotension, hypertension, and tachycardia have been reported after ingestion of methylene chloride.

0.2.6 RESPIRATORY

0.2.6.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Pulmonary irritation and cough may develop after inhalation exposure. Pulmonary edema is rarely reported. Respiratory failure may develop secondary to CNS depression in severe exposures. Goodpasture's syndrome has been associated with one case of occupational exposure.

0.2.7 NEUROLOGIC

0.2.7.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Headache and light-headedness are common after inhalation. Psychomotor performance is impaired with acute exposure. Syncope, CNS depression and coma may develop with more severe exposure. CNS excitation including seizures may also occur.

0.2.8 GASTROINTESTINAL

0.2.8.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Nausea and vomiting are common after inhalation exposure. Gastrointestinal ulceration and bleeding and pancreatitis have been reported after ingestion.

0.2.9 HEPATIC

0.2.9.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Elevated liver enzyme levels rarely occur.

0.2.10 GENITOURINARY

0.2.10.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Renal effects are rare. Hematuria, acute tubular necrosis and the development of Goodpasture's syndrome hav been associated with exposure to methylene chloride.

0.2.13 HEMATOLOGIC

0.2.13.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Methylene chloride is metabolized to carbon monoxide. Carboxyhemoglobin as high as 50 percent are reported and levels may continue to rise for several hours after exposure has ceased. The apparent half-life of carboxyhemoglobin is prolonged to 13 hours because of ongoing production of carboxyhemoglobin.

0.2.14 DERMATOLOGIC

0.2.14.1 ACUTE EXPOSURE

A) WITH POISONING/EXPOSURE

1) Skin irritation, pain, numbness and mild burns may develop with acute exposure. Severe burns may develop with prolonged exposure or immersion. Systemic effects can result from absorption through the skin.

0.2.18 PSYCHIATRIC

0.2.18.1 ACUTE EXPOSURE

A) Delirium with auditory and visual hallucinations is rare but has been reported after chronic exposure.

0.2.20 REPRODUCTIVE HAZARDS

A) Methylene chloride was not found to be teratogenic in mice and rabbits. It crosses the placenta, and is found in breast milk, and has been associated with increased spontaneous abortion. However, few reproductive effects are seen in rats.

0.2.21 CARCINOGENICITY

0.2.21.1 IARC CATEGORY

A) IARC Carcinogenicity Ratings for CAS75-09-2 (IARC, 2004):

1) IARC Classification
a) Listed as: Dichloromethane (methylene chloride)
b) Carcinogen Rating: 2B
1) The agent (mixture) is possibly carcinogenic to humans. The exposure circumstance entails exposures that are possibly carcinogenic to humans. This category is used for agents, mixtures and exposure circumstances for whic there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in humans but there is sufficient evidence of carcinogenicity in experimental animals. In some instances, an agent, mixture or exposure circumstance for which there is inadequate evidence of carcinogenicity in humans but limited evidence o carcinogenicity in experimental animals together with supporting evidence from other relevant data may be place in this group.

0.2.21.2 HUMAN OVERVIEW

A) Methylene chloride is a suspected human carcinogen, based on inadequate human data but sufficient evidence in experimental animals.

0.2.21.3 ANIMAL OVERVIEW

A) Methylene chloride is considered to be a confirmed animal carcinogen; divergent results have been obtained in roden studies.

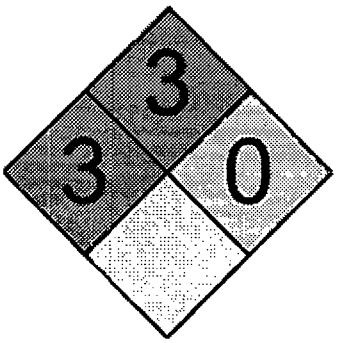
0.2.22 GENOTOXICITY

A) Results concerning the genotoxicity of methylene chloride have been conflicting in vivo and in vitro. It is generally mutagenic and can cause DNA breaks and chromosomal aberrations.

Triethylamine

CAS RN: 121-44-8

NFPA Hazard Classification



Health: 3 (Severe)
Materials that, on short exposure, could cause serious temporary or residual injury, including those requiring protection from all bodily contact. Fire fighters may enter the area only if they are protected from all contact with the material. Full protective clothing, including self-contained breathing apparatus, coat, pants, gloves, boots, and bands around legs, arms, and waist, should be provided. No skin surface should be exposed.

Flammability: 3 (Severe)
This degree includes Class IB and IC flammable liquids and materials that can be easily ignited under almost all normal temperature conditions. Water may be ineffective in controlling or extinguishing fires in such materials.

Instability: 0 (Minimal)
This degree includes materials that are normally stable, even under fire exposure conditions, and that do not react with water. Norma fire fighting procedures may be used.

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Triethylamine

CAS RN: 121-44-8

Basic - Major Uses

Chemical intermediate; anti-livering agent for urea & melamine based enamels; recovery of gelled paint vehicles; catalyst for polyurethane foams; flux for copper soldering

Catalytic solvent in chemical synth; accelerator activators for rubber; corrosion inhibitor; propellant; wetting, penetrating and waterproofing agents of quaternary ammonium types; curing and hardening of polymers (eg, core-binding resins)

Catalyst for epoxy resins

Manufacture of ... dyestuffs

Stabilizer for amino resins in coating system.

In the prep of quaternary ammonium compounds

Triethylamine is used to solubilize 2,4,5-T in water and serves as a selective extractant in the purification of antibiotics; also used to produce octadecyloxymethyltriethyl ammonium chloride (textile treatment agent)

Use in herbicides and pesticides and in preparation of emulsifiers for pesticides; use in non-nutritive sweeteners, ketenes, and salts; ingredient of photographic development accelerator, for drying of printing inks, and in carpet cleaners.

Triethylamine

CAS RN: 121-44-8

Basic - Storage Conditions

Avoid oxidizing materials, acids, and sources of halogens. Store in cool, dry, well-ventilated location.

Storage temp: ambient

Keep container closed and store in a cool, dark place.

Triethylamine

CAS RN: 121-44-8

Hazmat - Fire Potential

Dangerous, when exposed to heat, flame, or oxidizers.

Contact with strong oxidizers may cause fires ... .

Triethylamine

CAS RN: 121-44-8

Hazmat - Reactivities/Incompatibilities

Contact with strong acids may cause violent spattering.

The complex, containing excess ... /dinitrogen tetraoxide/ over ... /triethylamine/, exploded at below 0 deg C when free of solvent.

Incompatability: dinitrogen tetraoxide

Strong oxidizers, strong acids, chlorine, hypochlorite, halogenated compounds.

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Triethylamine

CAS RN: 121-44-8

Hazmat - Toxic Combustion Products

Toxic gases and vapors (such as oxides of nitrogen and carbon monoxide) may be released in fire involving triethylamine.

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Triethylamine

CAS RN: 121-44-8

Environment - Exposure Summary

Triethylamine's production and use as solvent and chemical intermediate may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 57.1 mm Hg at 25 deg C indicates triethylamine will exist solely as a vapor in the ambient atmosphere. Vapor-phase triethylamine will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 4 hrs. If released to soil, triethylamine is expected to have high mobility based upon an estimated Koc of 146. However, the pKa of triethylamine is 10.78, indicating that this compound will primarily exist in cation form in the environment and cations generally adsorb to organic carbon and clay more strongly than their neutral counterparts. Volatilization from moist soil surfaces will not be an important fate process because cations do not volatilize. Triethylami may volatilize from dry soil surfaces based upon its vapor pressure. Based on aerobic screening tests, triethylamine may be resistant t biodegradation in soil and water. Triethylamine, present at 30 mg/l, reached 28% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 100 mg/l and the Japanese MITI test. If released into water, triethylamine is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. However, triethylamine's pKa indicates that this compound will exist as a cation in neutral and acid waters and cations are expected to sorb to suspended solids and sediment. Volatilization from water surfaces will not be an important fate process since cations do not volatilize. A BCF of <5 for carp suggests the potential for bioconcentration in aquatic organisms is low. Occupational exposure to triethylamine may occur through inhalation and dermal contact with this compound at workplaces where triethylamine is produced or used. Monitoring data indicate that the general population may be exposed to triethylamine via inhalation of ambient air, and ingestion of food with this compound, and through use of other products containing triethylamine. (SRC)

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Triethylamine

CAS RN: 121-44-8

Medical - Health Effects

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

A) The primary clinical effects are irritation of the eyes, skin, and lungs, as well as central nervous system stimulation.
B) Ingestions have not been reported, but irritation or burns of the esophagus or gastrointestinal tract may be predicted to occur based on this agent's alkalinity and other irritant properties.
C) Myocardial degeneration was reported in rabbits exposed to 100 ppm for 6 weeks. This effect has not been reported humans. This agent produces marked irritation of the lungs. Rabbits exposed to concentrations as low as 100 ppm developed pulmonary injury within 6 weeks. By extrapolation of animal data, pulmonary edema might be expected in severe exposures.
D) Triethylamine's central nervous system stimulant properties appear to be closely related to its inhibitory action on monoamine oxidase activity. Faintness and anxiety have been transient symptoms reported with agents in this class. Headache may be seen with systemic absorption.
E) Nausea has been a transient symptom reported by workers. Cellular necrosis of the liver was noted in rabbits exposed to 100 ppm for 6 weeks. This effect has not been reported in humans.
F) Triethylamine is irritating to the eyes and may cause corneal damage. A drop in rabbit eyes caused severe injury graded 9 on a scale of 1 to 10 after 24 hours. Chronic exposure to concentrations as low as 50 ppm has caused multiple erosions of the cornea and conjunctiva in rabbit eyes. Eye irritation and corneal edema have been reported in humans from industrial exposure.
G) This agent may cause dermatitis and skin burns. It may also be a sensitizing agent.
H) Experimental reproductive effects and experimental mutation data have been reported.

0.2.4 HEENT

0.2.4.1 ACUTE EXPOSURE

A) This material is irritating to the eyes and may cause corneal damage due to its strong alkalinity. Eye irritation and corneal edema have been reported in humans from industrial exposures. Headache may also occur.

0.2.6 RESPIRATORY

0.2.6.1 ACUTE EXPOSURE

A) This agent produces marked irritation of the lungs. Pulmonary edema is a possibility.

0.2.7 NEUROLOGIC

0.2.7.1 ACUTE EXPOSURE

A) This compound's stimulant properties appear closely related to its MAO inhibitor activity.

0.2.14 DERMATOLOGIC

0.2.14.1 ACUTE EXPOSURE

A) This agent may cause dermatitis and skin burns, aqueous solutions have a pH of approximately 10.

0.2.21 CARCINOGENICITY

0.2.21.1 IARC CATEGORY

A) IARC Carcinogenicity Ratings for CAS121-44-8 (IARC, 2004):
1) Not Listed

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Hydrochloric Acid

CAS RN: 7647-01-0

Key Info

SUBSTANCES - TOXIC (Non-combustible)
• Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin

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Hydrochloric Acid

CAS RN: 7647-01-0

Hazmat - Reactivities/Incompatibilities

Inadvertent mixing of formaldehyde and hydrogen chloride could result in generation of bis(chloromethyl)ether, a potent human carcinogen.

Anhydrous hydrogen chloride is rapidly absorbed in water to form corrosive hydrochloric acid. Aqueous hydrochloric acid solutions are quite reactive. Reacts vigorously with alkalies and with many organic materials. Strong oxidizing materials cause release of chlorine. /Hydrogen chloride, anhydrous; hydrogen chloride, refrigerated liquid/

Cesium acetylene carbide burns in hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. /gas/

Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride ... Treated with concn hydrochloric acid produces spontaneously flammable gas.

Rubidium acetylene carbide burns with slightly warm hydrochloric acid or with molten sulfur. Rubidium carbide ignites in contact with hydrochloric acid unless acid is dilute.

Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine.

Calcium carbide reacts with hydrogen chloride gas with incandescence.

Calcium phosphide & hydrochloric acid undergo very energetic reaction.

Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg C. Sodium reacts very vigorously with gaseo hydrogen chloride. /gas/

Reaction of silver perchlorate with carbon tetrachloride in presence of small amt of hydrochloric acid produces trichloromethyl perchlorate, which detonates @ 40 deg C.

Aqueous hydrochloric acid solutions react with most metals, forming flammable hydrogen gas. /Hydrogen chloride, anhydrous; hydrogen chloride, refrigerated liquid/

Hydroxides, amines, alkalis, copper, brass, zinc [Note: Hydrochloric acid is highly corrosive to most metals].

With sulfuric acid: Accidental addition of 6,500 liters of concn hydrochloric acid to a bulk sulfuric acid storage tank released sufficient hydrogen chloride by dehydration to cause the tank to explode violently. Complete dehydration of hydrochloric acid solution releases some 250 volumes of gas.

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Hydrochloric Acid

CAS RN: 7647-01-0

Basic - Storage Conditions

Store in cool, dry, well-ventilated location. Separate from oxidizing materials, organic materials, and alkalies. /Hydrogen chloride, anhydrous; hydrogen chloride, refrigerated liquid/

The acid should not be stored in the vicinity of flammable or oxidizing substances, eg nitric acid or chlorates, or near metals and meta hydrides that may be attacked by the acid ... Electrical equipment should be flameproof and protected against corrosive action. ...

No part of a cylinder should be subjected to a temp above 52 deg C.

Storage areas should be well ventilated and have a cement floor and shelter from direct sunlight and heat should be provided.

Storage temp: Ambient or lower; Venting: Safety relief.

Hydrochloric Acid

CAS RN: 7647-01-0

Hazmat - Explosive Limits / Potential

Behavior in fire: Pressurized container may explode and release toxic, irritating vapors.

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Hydrochloric Acid

CAS RN: 7647-01-0

Medical - Health Effects

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

A) Hydrogen chloride is a severe corrosive irritant to the skin, eyes, nose, mucous membranes, respiratory tract and gastrointestinal tract. The extremely irritating effects of hydrogen chloride on the eyes, nose and throat are usually sufficient to cause withdrawal from exposure before severe damage ensues.

B) Inhalation of hydrochloric acid fumes produces nose, throat and laryngeal burning and irritation, pain and inflammation, coughing, sneezing, choking, hoarseness, dyspnea, bronchitis, chest pain, laryngeal spasms and upper respiratory tract edema, as well as headache and palpitations.

1) Inhalation of high concentrations can result in corrosive burns, necrosis of the bronchial epithelium, constrictio of the larynx and bronchi, nasoseptal perforation and glottal closure. Chemical pneumonitis and pulmonary edem can also occur after inhalation, particularly if exposure is prolonged.

2) The current NIOSH IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) air concentration for hydrogen chloride is 50 ppm.

C) Contact with fumes or liquid can produce corrosive burns. Dermal exposure also results in irritation, pain, dermatitis and ulceration. Contact with refrigerated liquid can produce frostbite.

D) Eye contact with fumes is extremely irritating. Contact with liquid produces pain, swelling, conjunctivitis, corneal erosion, and necrosis of conjunctiva and corneal epithelium with perforation or scarring. Liquid splashed in the eye can result in permanent ocular damage.

E) Ingestion of the liquid produces corrosive burns of the gastrointestinal tract. Signs and symptoms of ingestion include pain, irritation, nausea, vomiting (with 'coffee-ground' emesis), thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, nephritis, and burns, ulceration and perforation of the gastrointestinal tract.

1) Stomach corrosion can result in gastric perforation and resultant peritonitis. Strictures and stenosis (esophage gastric and pyloric) can also result from ingestion.

F) Death after exposure to hydrochloric acid may result from circulatory shock, asphyxia (with laryngeal and glottal edema), or stomach perforation (with peritonitis, gastric hemorrhage and infection).

G) Chronic or prolonged exposure may be associated with changes in pulmonary function, chronic bronchitis, dermatitis, decay and erosion of dental enamel, bleeding of nose and gums, nasal and oral mucosal ulceration, conjunctivitis, and overt upper respiratory tract abnormalities. No significant effects have been seen with chronic exposure to low levels of gaseous hydrogen chloride. Symptoms may be delayed 1 or 2 days.

H) For information about the medical effects of exposure to liquid hydrochloric acid, refer to the "ACIDS" MEDITEXT(TM) Medical Management.

0.2.1.2 CHRONIC EXPOSURE

A) Chronic or prolonged exposure may be associated with changes in pulmonary function, chronic bronchitis, dermatitis, erosion of dental enamel, conjunctivitis, and overt upper respiratory tract abnormalities. No significant effects have been seen from chronic exposure to low levels of gaseous hydrogen chloride. Symptoms may be delayed 1 or 2 days.

1) Chronic exposure to the anhydrous form is unlikely because of its highly affinity for water.

2) Because of its highly irritating and excellent warning properties, acute poisoning from hydrogen chloride occurs only rarely in controlled industrial environments except in accidental exposures. Poisoning can occur from inhalation, dermal, or oral exposure; it is a strong irritant of the eyes and skin. When heated to decomposition, hydrogen chloride emits toxic fumes of chloride.

3) True systemic poisoning is highly unlikely because both hydronium ions and chloride ions are normal constituents of the body. However, the importance of hydrogen chloride as a strong poison should not be underestimated; the anhydrous gas can be fatal by the inhalation or dermal routes. Significant oral exposure is no likely because of its physical form.

B) Chronic or prolonged exposure may be associated with changes in pulmonary function, chronic bronchitis, dermatitis, erosion of dental enamel, conjunctivitis, and overt upper respiratory tract abnormalities. No significant effects have been seen from chronic exposure to low levels of gaseous hydrogen chloride. Symptoms may be delayed 1 or 2 days.

0.2.3 VITAL SIGNS

0.2.3.1 ACUTE EXPOSURE

A) Shock, rapid breathing and pulse, circulatory collapse and other changes to pulse, blood pressure, and respiration ma occur.

0.2.4 HEENT

0.2.4.1 ACUTE EXPOSURE

A) Dental discoloration or erosion, bleeding gums, corneal necrosis, conjunctivitis, eye and nasal irritation, nasal ulceration, nose bleeds, throat irritation and ulceration have been observed.

0.2.5 CARDIOVASCULAR

0.2.5.1 ACUTE EXPOSURE

A) Circulatory collapse and ischemic lesions may occur.

0.2.6 RESPIRATORY

0.2.6.1 ACUTE EXPOSURE

A) Changes in breathing pattern, irritation, changes in pulmonary function, corrosion and edema of the respiratory tract, chronic bronchitis and noncardiogenic pulmonary edema have been observed.

0.2.8 GASTROINTESTINAL

0.2.8.1 ACUTE EXPOSURE

A) Gastritis, burns, gastric hemorrhage, dilation, edema, necrosis, and strictures may occur.

0.2.9 HEPATIC

0.2.9.1 ACUTE EXPOSURE

A) Ischemia and hepatotoxicity may be observed.

0.2.10 GENITOURINARY

0.2.10.1 ACUTE EXPOSURE

A) Nephritis and renal failure may occur.

0.2.11 ACID-BASE

0.2.11.1 ACUTE EXPOSURE

A) Hyperchloremic metabolic acidosis may occur.

0.2.12 FLUID-ELECTROLYTE

0.2.12.2 CHRONIC EXPOSURE

A) Chlorosis may occur with prolonged or chronic exposure.

0.2.13 HEMATOLOGIC

0.2.13.1 ACUTE EXPOSURE

A) Coagulopathy has been reported following an acute ingestion of hydrochloric acid.

0.2.13.2 CHRONIC EXPOSURE

A) A diminished hemoglobin content developed in exposed animals.

0.2.14 DERMATOLOGIC

0.2.14.1 ACUTE EXPOSURE

A) Burns, ulceration, scarring, blanching, and irritation may occur.

0.2.14.2 CHRONIC EXPOSURE

A) Dermatitis may occur with prolonged or chronic exposure.

0.2.20 REPRODUCTIVE HAZARDS

A) Fetotoxicity, developmental abnormalities, and possible resistance to hydrogen chloride by inhalation during pregnancy have been noted.
B) At the time of this review, no data were available on the possible effects of hydrogen chloride exposure during lactation.
C) No information about possible male reproductive effects was found in available references at the time of this review.

0.2.21 CARCINOGENICITY

0.2.21.1 IARC CATEGORY

A) IARC Carcinogenicity Ratings for CAS7647-01-0 (IARC, 2004):

1) IARC Classification

a) Listed as: Hydrochloric acid

b) Carcinogen Rating: 3

1) The agent (mixture or exposure circumstance) is not classifiable as to its carcinogenicity to humans. This category is used most commonly for agents, mixtures and exposure circumstances for which the evidence of carcinogenicity is inadequate in humans and inadequate or limited in experimental animals. Exceptionally, agents (mixtures) for which the evidence of carcinogenicity is inadequate in humans but sufficient in experimental anima may be placed in this category when there is strong evidence that the mechanism of carcinogenicity in experimental animals does not operate in humans. Agents, mixtures and exposure circumstances that do not fall into any other group are also placed in this category.

0.2.21.2 HUMAN OVERVIEW

A) There has been a lack of conclusive data regarding the carcinogenicity of this agent; however, carcinogenic effects m occur when this agent is in combination with other substances.

0.2.22 GENOTOXICITY

A) DNA repair, genotoxicity, sex chromosome loss and chromosome aberrations have been observed.

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