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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

ALLYL CHLORIDE

C3-H5-Cl, CH₂=CH-CH₂-Cl, 3-chloropropene, 3-chloropropene, 3-chloropropylene, 3-chloropropylene, 3-chloropropene, 3-chloropropene, 3-chloro-1-propene, 3-chloro-1-propene, 3-chloropropene-1, 3-chloropropene-1, 3-chloro-1-propylene, 3-chloro-1-propylene, chloroallylene, chlorallylene, "1-chloro propene-2", "1-chloro propene-2", 1-chloro-2-propene, 1-chloro-2-propene, "1-propene, 3-chloro-", "1-propene, 3-chloro-", "propene, 3-chloro", "propene, 3-chloro", "2-propenyl chloride", "2-propenyl chloride", alpha-chloropropylene

ALLYL CHLORIDE

The major use is as a chemical intermediate, especially in the synthesis of allyl compounds.

Company: S D FINE - CHEM LIMITED

Address:

315- 317, T.V.IND.ESTATE,
248 WORLI ROAD,
MUMBAI- 400 030, INDIA

technical@sdfine.com

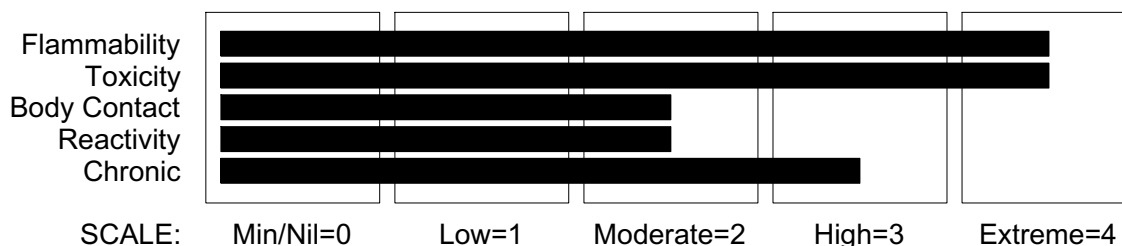
Telephone: 91- 22 24959898

Telephone: 91- 22 24959899

Fax: 91- 22 24937232

Section 2 - HAZARDS IDENTIFICATION

HAZARD RATINGS



GHS Classification

Acute Aquatic Hazard Category 1

Acute Toxicity (Dermal) Category 4

continued...

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Section 2 - HAZARDS IDENTIFICATION

Acute Toxicity (Inhalation) Category 3
Acute Toxicity (Oral) Category 4
Carcinogen Category 2
Eye Irritation Category 2A
Flammable Liquid Category 2
Germ Cell Mutagen Category 1B
Organ Damage Category 2
Reproductive Toxicity Category 1B
Respiratory Irritation Category 3
Skin Corrosion/Irritation Category 2



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H335 H225 H331 H302 H312 H315 H319 H340 H351 H360 H373 H400

May cause respiratory irritation

Highly flammable liquid and vapour

Toxic if inhaled

Harmful if swallowed

Harmful in contact with skin

Causes skin irritation

Causes serious eye irritation

May cause genetic defects

Suspected of causing cancer

May damage the unborn child

May cause damage to organs through prolonged or repeated exposure by inhalation.

Very toxic to aquatic life

PRECAUTIONARY STATEMENTS

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Keep container tightly closed.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting equipment

Use only non-sparking tools.

Take precautionary measures against static discharge.

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

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

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

Use only outdoors or in a well-ventilated area.

Avoid release to the environment.

Wear protective gloves/protective clothing/eye protection/face protection.

Use personal protective equipment as required.

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Section 2 - HAZARDS IDENTIFICATION

Response

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

IF ON SKIN: Wash with plenty of soap and water.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

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

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

IF exposed or concerned: Get medical advice/ attention.

Call a POISON CENTER or doctor/physician.

Call a POISON CENTER or doctor/physician if you feel unwell.

Get medical advice/attention if you feel unwell.

Rinse mouth.

If eye irritation persists: Get medical advice/attention.

Wash contaminated clothing before reuse.

Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
allyl chloride	107-05-1	> 97

Section 4 - FIRST AID MEASURES

SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
 - For advice, contact a Poisons Information Centre or a doctor.
 - Urgent hospital treatment is likely to be needed.
 - 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.
 - 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 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.

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.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

continued...

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Section 4 - FIRST AID MEASURES

SKIN

- If skin contact occurs:
 - Immediately remove all contaminated clothing, including footwear.
 - Flush skin and hair with running water (and soap if available).
 - Seek medical attention in event of irritation.

INHALED

- 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, without delay.

NOTES TO PHYSICIAN

- for poisons (where specific treatment regime is absent):
-

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
 - Watch for signs of respiratory insufficiency and assist ventilation as necessary.
 - Administer oxygen by non-rebreather mask at 10 to 15 L/min.
 - Monitor and treat, where necessary, for pulmonary oedema .
 - Monitor and treat, where necessary, for shock.
 - Anticipate seizures .
 - DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
-

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994.

DO NOT administer sympathomimetic drugs as they may cause ventricular arrhythmias.

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...

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Section 5 - FIRE FIGHTING MEASURES

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).
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- 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.

FIRE/EXPLOSION HAZARD

- Combustion products include: carbon dioxide (CO₂), hydrogen chloride, phosgene, other pyrolysis products typical of burning organic material.
 - Liquid and vapour are highly flammable.
 - Severe fire hazard when exposed to heat, flame and/or oxidisers.
 - Vapour forms an explosive mixture with air.
 - Severe explosion hazard, in the form of vapour, when exposed to flame or spark.
 - Vapour may travel a considerable distance to source of ignition.
 - Heating may cause expansion / decomposition with violent rupture of containers.
 - On combustion, may emit toxic fumes of carbon monoxide (CO).
- Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

FIRE INCOMPATIBILITY

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

Personal Protective Equipment

Gas tight chemical resistant suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

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

- Chemical Class: aliphatics, halogenated
- For release onto land: recommended sorbents listed in order of priority.

SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
LAND SPILL - SMALL				

continued...

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Section 6 - ACCIDENTAL RELEASE MEASURES

cross- linked polymer - particulate	1	shovel	shovel	R, W, SS
cross- linked polymer - pillow	1	throw	pitchfork	R, DGC, RT
wood fiber - pillow	2	throw	pitchfork	R, P, DGC, RT
treated wood fibre - particulate	2	shovel	shovel	R, W, DGC
sorbent clay - particulate	3	shovel	shovel	R, I, P
foamed glass - pillow	3	throw	pitchfork	R, P, DGC, RT

LAND SPILL - MEDIUM

cross- linked polymer - particulate	1	blower	skiploader	R, W, SS
cross- linked polymer - pillow	2	throw	skiploader	R, DGC, RT
sorbent clay - particulate	3	blower	skiploader	R, I, P
polypropylene - particulate	3	blower	skiploader	W, SS, DGC
foamed glass - pillow	3	throw	skiploader	R, P, DGC, RT
expanded mineral - particulate	4	blower	skiploader	R, I, W, P, DGC

Legend

DGC: Not effective where ground cover is dense

R; Not reusable

I: Not incinerable

P: Effectiveness reduced when rainy

RT:Not effective where terrain is rugged

SS: Not for use within environmentally sensitive sites

W: Effectiveness reduced when windy

Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;

R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988.

- 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).
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse / absorb vapour.
- Contain spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

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ALLYL CHLORIDE

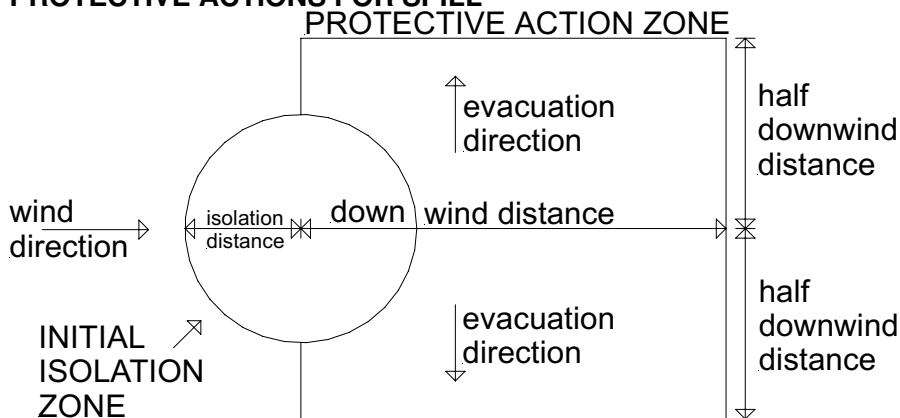
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Section 6 - ACCIDENTAL RELEASE MEASURES

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance	50 metres
Downwind Protection Distance	300 metres
IERG Number	18

FOOTNOTES

- 1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.
- 2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.
- 3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.
- 4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills".
LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.
- 5 Guide 131 is taken from the US DOT emergency response guide book.
- 6 IERG information is derived from CANUTEC - Transport Canada.

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:

allyl chloride 300ppm

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

allyl chloride 40ppm

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

allyl chloride 3ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

continued...

ALLYL CHLORIDE

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Section 6 - ACCIDENTAL RELEASE MEASURES

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
R51	$\geq 2.5\%$		
else	$\geq 10\%$		

where percentage is percentage of ingredient found in the mixture

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- DO NOT allow clothing wet with material to stay in contact with skin.

Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours.
- 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, heat or ignition sources.
- When handling, DO NOT eat, drink or smoke.
- Vapour may ignite on pumping or pouring due to static electricity.
- DO NOT use plastic buckets.
- Earth and secure metal containers when dispensing or pouring product.
- Use spark-free tools when handling.
- Avoid contact with incompatible materials.
- Keep containers securely sealed.
- 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

- 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.
- For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C)
- For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)
- Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C)
- (i) : Removable head packaging;
- (ii) : Cans with friction closures and
- (iii) : low pressure tubes and cartridges may be used.
- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages
- In addition, where inner packagings are glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close fitting moulded

continued...

ALLYL CHLORIDE

plastic box and the substances are not incompatible with the plastic.

STORAGE INCOMPATIBILITY

■ Allyl chloride

- may polymerise violently and explodes at elevated temperatures, on exposure to light, on contact with acid catalysts, ferric chloride, aluminium chloride, Lewis acids, boron trifluoride, sulfuric acid, Ziegler catalysts, finely divided metals.
 - reacts violently with oxidisers, alkyl aluminium chlorides or on contact with aluminium, magnesium, zinc (or galvanised metals) producing organometallic compounds
 - is incompatible with strong acids, oleum, amines, chlorosulfonic acid, ethylenediamine, ethyleneimine, sodium hydroxide
 - slowly decomposes in the presence of moisture
 - attacks some coatings, plastics and rubber
 - is corrosive to steel
 - may generate static charge on flow or agitation.
 - Haloalkenes are highly reactive.
 - Some of the more lightly substituted lower members are highly flammable; many members of the group are peroxidisable and polymerisable.
 - Avoid reaction or contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact. Severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures.
- BREITHERICK L.: Handbook of Reactive Chemical Hazards
- Avoid reaction with metal halides and active metals, eg. sodium (Na), potassium (K), calcium (Ca), zinc (Zn), powdered aluminium (Al), magnesium (Mg) and magnesium alloys.
 - Avoid contact with rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene.
 - Avoid strong bases.

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.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³
Australia Exposure Standards	allyl chloride (Allyl chloride)	1	3	2	6

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
allyl chloride		250

MATERIAL DATA

ALLYL CHLORIDE:

■ For allyl chloride:

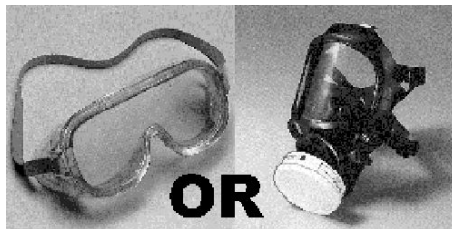
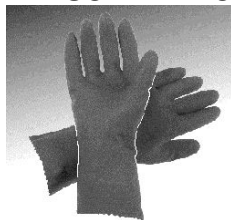
Odour Threshold Value: 0.48 ppm (recognition)

Exposure at or below the TLV-TWA is thought to prevent liver injury. Olfactory warning properties of allyl chloride should not be relied upon to provide any degree of protection when repeated exposure is likely.

Odour Safety Factor (OSF)

OSF=0.83 (ALLYL CHLORIDE).

PERSONAL PROTECTION



EYE

- 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

- Wear chemical protective gloves, eg. PVC.
 - Wear safety footwear or safety gumboots, eg. Rubber.
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- Neoprene gloves.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

GLOVE SELECTION INDEX

■ Glove selection is based on a modified presentation of the:

" Forsberg Clothing Performance Index" .

The effect(s) of the following substance(s) are taken into account in the computer- generated selection: allyl chloride

■ Protective Material CPI *.

PVA	A
TEFLON	A
VITON	C

■

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

RESPIRATOR

■ Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	AX- AUS P	-
1000	50	-	AX- AUS P
5000	50	Airline *	-
5000	100	-	AX- 2 P
10000	100	-	AX- 3 P
	100+		Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

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.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

■ CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

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:

solvent, vapours, degreasing etc., evaporating from tank (in still air).

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)

direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)

Air Speed:

0.25- 0.5 m/s (50- 100 f/min.)

0.5- 1 m/s (100- 200 f/min.)

1- 2.5 m/s (200- 500 f/min.)

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

A mobile liquid. Colourless or pale yellow ("water-washed" grade) to dark brown or purple (anhydrous grade). It has a characteristic unpleasant, irritating and penetrating pungent odour. Slightly miscible with water (0.36% at 25 C). Miscible with alcohol, ether, petroleum ether, acetone, chloroform, and benzene.

PHYSICAL PROPERTIES

Liquid.

Does not mix with water.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Floats on water.

State	Liquid	Molecular Weight	76.53
Melting Range (°C)	- 136.4	Viscosity	Not Available
Boiling Range (°C)	44- 48 (96% min)	Solubility in water (g/L)	Partly miscible
Flash Point (°C)	- 31 (TCC)	pH (1% solution)	Not available
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°C)	391	Vapour Pressure (kPa)	39.3 @ 20 C
Upper Explosive Limit (%)	11.2	Specific Gravity (water=1)	0.938 @ 20 C
Lower Explosive Limit (%)	2.9	Relative Vapour Density (air=1)	2.64
Volatile Component (%vol)	~100	Evaporation Rate	Not available
Gas group	IIA		

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

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

For incompatible materials - refer to Section 7 - Handling and Storage.

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.
- Oral doses of 300 or 500 mg/kg allyl chloride, three times weekly for periods of 2 to 17 weeks produced functional disability in some mice. Apart from evidence of kidney damage in 70% of dosed animals pathological changes in the nervous system occurred. Nerve fibre degeneration was found in peripheral nerves and roots and degenerated fibres were found in dorsal, ventral and lateral columns of the spinal cord. Males were more severely affected than females. Animals appeared to become tolerant to allyl chloride after continuous dosing. Neuropathy appeared to be a central-peripheral distal type of axonopathy.
- At sufficiently high doses the material may be nephrotoxic(i.e. poisonous to the kidney).
- At sufficiently high doses the material may be hepatotoxic(i.e. poisonous to the liver).

EYE

- This material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.
- Irritation of the eyes may produce a heavy secretion of tears (lachrymation).

SKIN

- Skin contact with the material may be harmful; systemic effects may result following absorption.
- This material can cause inflammation of the skin oncontact in some persons.
- The material may accentuate any pre-existing dermatitis condition.
- Prolonged or repeated exposure to allyl chloride may cause severe skin burns, possibly of a delayed nature and/or deep seated pain.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage

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Section 11 - TOXICOLOGICAL INFORMATION

is suitably protected.

INHALED

- Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
- The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
- Inhalation studies with allyl chloride show the liver, kidneys, nervous system and lungs may be injured following exposure. Microscopic changes and other parameters indicative of kidney damage become progressively more severe in rats and mice with increasing levels of exposure (200 to 2000 ppm/ 6 hr). Sex differences in mortality and kidney toxicity were noted with female rats and male mice being most susceptible. In subchronic studies, using rabbits, cats and rats, high exposure concentrations (66 ppm; 206 mg/m³, 6 hours/day, 6 days/week for 3 months) produced muscle weakness of the extremities, lurching motion and unsteady gait in rabbits after 2 months exposure. Some rabbits developed paralysis. Cats showed only muscle weakness and unsteady gait. When rats were exposed 250 ppm for 90 days there were microscopic changes in the kidneys characterised by increased cytoplasmic granularity and eosinophilic staining of the cortical epithelial cells as well as an increased incidence of focal tubular collapse and atrophy. Mice did not exhibit these effects. Peripheral neuropathy and axonal damage occurred in rabbits receiving allyl chloride by inhalation or subcutaneous injection and in mice given allyl chloride orally with the most severe degeneration occurring in the distal regions of peripheral nerves. Degeneration of the spinal cord followed a pattern of central-peripheral distal neuropathy. Rats, guinea pigs and rabbits exposed repeatedly at an average concentration of 8 ppm (28 seven hour exposures during a 35-day period) showed liver and kidney damage characterised by dilation of the sinusoids, cloudy swelling and focal necrosis of the liver and by changes in the glomeruli, necrosis of the epithelium of the convoluted tubules and proliferation of the interstitial tissues of the kidneys.

CHRONIC HEALTH EFFECTS

- There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation.

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

There is some evidence from animal testing that exposure to this material may result in toxic effects to the unborn baby.

Chronic allyl chloride exposure produces toxic neuropathy.

Workers exposed to allyl chloride (during the manufacture of sodium allyl sulfonate) at levels of 2.6 to 6650 mg/m³ (0.83-2127 ppm) for 2.5 months to 6 years complained of weakness, paraesthesia and numbness of the extremities. Electroneuromyography showed neurogenic abnormalities in 10 of 19 subjects examined.

When administered by gavage to male and female mice allyl chloride produces neoplastic and non-neoplastic lesions of the forestomach. Allyl chloride was also active as a skin tumour initiator in a two-stage carcinogenicity assay with phorbol used as the promoter.

Allyl chloride was not considered teratogenic or embryo-lethal in rats or rabbits following inhalation exposure at concentrations that induced effects in maternal animals.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Inhalation (human) LCLo: 3000 ppm
Oral (rat) LD50: 460 mg/kg
Inhalation (rat) LC50: 11000 mg/m³/2h
Oral (mouse) LD50: 425 mg/kg
Inhalation (mouse) LC50: 155 mg/kg

IRRITATION

Eye (rat): 290 ppm/6h
Skin (rabbit): 10 mg/24h (open)
Eye (rabbit): 500 mg - Moderate
Eye (guinea pig): 290 ppm/6h

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Section 11 - TOXICOLOGICAL INFORMATION

Intraperitoneal (mouse) LD50: 155 mg/kg

Dermal (rabbit) LD50: 2066 mg/kg

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. Ally chloride was found to be harmful in acute oral toxicity tests and toxic in inhalation toxicity tests. No overall NOAEL could be established from the oral studies in mice, rats and rabbits.

Inhalation studies have been carried out in mice, rats, rabbits and cats with exposures varying from 5 weeks to 6 months. The target organs were liver, kidneys and lungs and the central nervous system. In a recent adequate study, not focusing on neurotoxicity, with rats the NOAEL was 155 mg/m³ (duration adjusted: 27 mg/m³). At higher dose levels slight tubular degeneration in the kidneys of both sexes was observed.

The neurotoxic effects of allyl chloride have been studied extensively in mice, rats, rabbits and cats. Ally chloride is a neurotoxic agent, which especially damages the peripheral nervous system resulting in a dying-back pattern of axonal degeneration. In the most reliable study a NOAEL for neurotoxicity of 31 mg/m³ (duration adjusted: 7.38 mg/m³) has been established.

Reproduction studies have not been carried out with allyl chloride. However, effects on the male reproductive system were investigated in vitro as well as in vivo. Testosterone production was not affected in rat foetal testes in vitro. Effects on the male gonads of rats and rabbits were observed in vivo. In mice, which survived a single s.c.dose = 496 mg/kg b.w. allyl chloride, various degrees of damage in the testes was observed. However, no histopathological effects were found in the testes of rats after subchronic inhalatory exposure to concentrations =782.5 mg/m³. In developmental studies with rats and rabbits by the inhalation route a slight delay in skeletal development in rats was observed at maternal toxic doses. In adequately performed studies the NOAEL for foetal/embryo and maternal toxicity was 93 mg/m³ (duration adjusted: 27.3 mg/m³).

Based on all available mutagenicity data it can be concluded that allyl chloride is mutagenic to bacteria and yeast and induces UDS in human HeLa cells, but not in embryonic testinal cells. Allyl chloride did not cause chromosome aberrations in vitro in mammalian cells. Negative results were obtained in the available in vivo tests.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

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.

CARCINOGEN

Allyl chloride	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
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continued...

ALLYL CHLORIDE

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

ALLYL CHLORIDE:

■ Hazardous Air Pollutant:	Yes
■ Half- life Soil - High (hours):	335
■ Half- life Soil - Low (hours):	166
■ Half- life Air - High (hours):	28.8
■ Half- life Air - Low (hours):	3.03
■ Half- life Surface water - High (hours):	335
■ Half- life Surface water - Low (hours):	166
■ Half- life Ground water - High (hours):	672
■ Half- life Ground water - Low (hours):	168
■ Aqueous biodegradation - Aerobic - High (hours):	672
■ Aqueous biodegradation - Aerobic - Low (hours):	168
■ Aqueous biodegradation - Anaerobic - High (hours):	2688
■ Aqueous biodegradation - Anaerobic - Low (hours):	672
■ Photooxidation half- life air - High (hours):	28.8
■ Photooxidation half- life air - Low (hours):	3.03
■ First order hydrolysis half- life (hours):	335

■ Very toxic to aquatic organisms.

■ Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters. Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

■ For allyl chloride:

Vapour pressure 395 hPa (20 C)

Water solubility 3600 mg/l (20 C)log Kow 2.1

Henry's law constant 835 Pa.m³/mol (25 C) calc.)

BOD 5: 0.23,14%

COD: 0.86,51%

Environmental fate:

Most important emissions of allyl chloride will probably occur to the atmosphere. Allyl chloride is volatile (estimated to partition 99.35 and 0.59%, air and water respectively), will be removed rapidly from the atmosphere by photodegradation: half life for the reaction with OH-radicals is less than 1 day and if allyl chloride is emitted into water it will rapidly volatilise to the air. Hydrolysis will occur (hydrolysis t_{1/2} of 12 days, pH 8), but this is not thought to be an important removal process due to the high volatilisation. Biodegradation: Results from biodegradation tests are equivocal. A modified MITI test indicates a borderline case of ready biodegradability: 55-69% based on BOD after 28 days. It is unknown whether the 10 day time-window was reached (>60% degradation within 10 days). In another test degradation of allyl chloride was shown: BOD was 14 and 25% of ThOD after 5 days with non-adapted and adapted seed, respectively. This test is not equal to a standard OECD test for ready-biodegradability. However, when it is assumed that in the MITI test the 10 day time-window has probably been reached, it can be concluded that allyl chloride can be degraded in the environment. Based on the information available the compound is considered readily biodegradable.

Ecotoxicity:

Allyl chloride is considered to be toxic to fish, with 24-96 hrs LC₅₀-values ranging from 6.9 to 70 mg/l.

Allyl chloride is found to be also toxic to fish in a test with a deviating exposure time of 14 days. The lowest LC₅₀-value of 0.34 mg/l is found in a 48-h study with *Xanopus laevis*. Chronic NOEC values for algae and protozoa are ranging from 6.3 to 8.6 mg/l, and for bacteria of 115 mg/l.

■ Substances containing unsaturated carbons are ubiquitous in indoor environments. They result from many sources (see below). Most are reactive with environmental ozone and many produce stable products which are thought to adversely affect human health. The potential for surfaces in an enclosed space to facilitate reactions should be considered.

Source of unsaturated substances

Unsaturated substances (Reactive Emissions)

Major Stable Products produced following reaction with ozone.

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Occupants (exhaled breath, ski oils, personal care products)	Isoprene, nitric oxide, squalene, unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products	Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, 6MHQ, geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid.
Soft woods, wood flooring, including cypress, cedar and silver fir boards, houseplants	Isoprene, limonene, alpha-pinene, other terpenes and sesquiterpenes	Formaldehyde, 4- AMC, pinoaldehyde, pinic acid, pinonic acid, formic acid, methacrolein, methyl vinyl ketone, SOAs including ultrafine particles
Carpets and carpet backing	4- Phenylcyclohexene, 4-vinylcyclohexene, styrene, 2-ethylhexyl acrylate, unsaturated fatty acids and esters	Formaldehyde, acetaldehyde, benzaldehyde, hexanal, nonanal, 2- nonenal
Linoleum and paints/polishes containing linseed oil	Linoleic acid, linolenic acid	Propanal, hexanal, nonanal, 2-heptenal, 2- nonenal, 2-decenal, 1- pentene- 3- one, propionic acid, n- butyric acid
Latex paint Certain cleaning products, polishes, waxes, air fresheners	Residual monomers Limonene, alpha- pinene, terpinolene, alpha- terpineol, linalool, linalyl acetate and other terpenoids, longifolene and other sesquiterpenes	Formaldehyde Formaldehyde, acetaldehyde, glycoaldehyde, formic acid, acetic acid, hydrogen and organic peroxides, acetone, benzaldehyde, 4- hydroxy- 4- methyl- 5- hexen- 1- al, 5- ethenyl- dihydro- 5- methyl- 2(3H)- furanone, 4- AMC, SOAs including ultrafine particles
Natural rubber adhesive	Isoprene, terpenes	Formaldehyde, methacrolein, methyl vinyl ketone
Photocopier toner, printed paper, styrene polymers Environmental tobacco smoke	Styrene Styrene, acrolein, nicotine	Formaldehyde, benzaldehyde
Soiled clothing, fabrics, bedding	Squalene, unsaturated sterols, oleic acid and other saturated fatty acids	Formaldehyde, benzaldehyde, hexanal, glyoxal, N-methylformamide, nicotinaldehyde, cotinine
Soiled particle filters	Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles	Acetone, geranyl acetone, 6MHO, 4OPA, formaldehyde, nonanal, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid
Ventilation ducts and duct liners	Unsaturated fatty acids and esters, unsaturated oils, neoprene	Formaldehyde, nonanal, and other aldehydes; azelaic acid; nonanoic acid; 9- oxo- nonanoic acid and other oxo- acids; compounds with mixed functional groups (=O, - OH, and - COOH)
" Urban grime"	Polycyclic aromatic hydrocarbons	C5 to C10 aldehydes
Perfumes, colognes, essential oils (e.g. lavender, eucalyptus, tea tree)	Limonene, alpha- pinene, linalool, linalyl acetate, terpinene- 4- ol, gamma-terpinene	Oxidized polycyclic aromatic hydrocarbons Formaldehyde, 4- AMC, acetone, 4- hydroxy- 4- methyl- 5- hexen- 1- al, 5- ethenyl- dihydro- 5- methyl- 2(3H) furanone, SOAs including ultrafine particles

continued...

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Overall home emissions	Limonene, alpha- pinene, styrene	Formaldehyde, 4- AMC, pinonaldehyde, acetone, pinic acid, pinonic acid, formic acid, benzaldehyde, SOAs including ultrafine particles
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Abbreviations: 4-AMC, 4-acetyl-1-methylcyclohexene; 6MHQ, 6-methyl-5-heptene-2-one, 4OPA, 4-oxopentanal, SOA, Secondary Organic Aerosols

Reference: Charles J Weschler; Environmental Health Perspectives, Vol 114, October 2006.

■ For haloalkanes and haloalkenes:

Environmental fate:

Certain haloalkane gases in the atmosphere can also contribute to the greenhouse effect by restricting heat loss from the Earth's atmosphere through absorbing infrared emissions from the surface. Generally haloalkanes contributing to the greenhouse effect consist of a fully or partly fluorinated carbon backbone.

Gas-phase reactions with OH radicals are the major tropospheric loss process for the haloalkanes. In addition photooxidation reactions with O₃ and NO₃ radicals can result in transformation.

Organic substances containing chlorine, if primarily present in the atmospheric compartment and if their lifetime is long enough can reach the stratosphere and decompose through photolysis and other chemical reaction (e.g. with OH radical). Chlorine atoms can then participate in the catalytic ozone destruction cycles. The atmospheric lifetime is too short to enable a significant fraction of the compound emitted to reach the stratosphere

Haloalkanes do not hydrolyse easily. Acids do not catalyse the hydrolysis and base catalysis is only important at higher pHs than are observed in the environment.

The apparent hazard of halo- alkanes and alkenes to human health has prompted investigations concerning their fate in subsurface waters and in soil. Although abiotic transformations may be significant within the time scales commonly associated with groundwater movement, biotic process typically proceed much faster, provided that there are sufficient substrates, nutrients and microbial populations to mediate such transformations. Several bacterial strains including methane-utilising bacteria capable of utilising haloalkanes have been isolated. Microbial dehalogenation by these strains is mediated by enzymes (oxygenase and hydrolase). The biodegradation of haloalkanes can proceed through different pathways. Haloparaffins (C₁₂ to C₁₈) have been reported to be incorporated into fatty acids in bacteria, yeasts, and fungi , resulting in their accumulation in the food chain. Another pathway is the oxygenation at the nonhalogenated end of monohalogenated alkanes by an inherent oxygenase with a tight substrate selectivity. In this case fluoroalkanes were defluorinated, but no dehalogenation was observed with chloro-, bromo-, or iodoalkanes. Chain length was reported to have minor effects on this oxygenation reaction. In general, alpha- and alpha,omega-chlorinated haloalkanes with short carbon chains (C₁ to C₆) are dehalogenated hydrolytically or by a glutathione-dependent mechanism. In contrast, alpha- and alpha,omega-haloalkanes with longer chains, e.g., 1,9-dichlorononane and 1,10-dichlorodecane (1,10-DCD), have been proposed to be dehalogenated by oxidative mechanisms. Studies on the biodegradation of this class of compounds are rare, because haloalkane-degrading microorganisms are not easily found

In water and terrestrial compartments haloalkanes may hydrolyse in the presence of naturally occurring sulfur-containing nucleophiles Bisulfide ion (HS⁻) is generally the most important nucleophile because it is moderately reactive and is usually present at the highest concentration. When elemental sulfur is present, polysulfides(S₄ 2- and S₅ 2-) will be more important than HS⁻ at pH 7 (approximately) because they are 60 times more reactive and their equilibrium concentrations increase with increasing pH. The end products of such reactions include a variety of mercaptans and dialkyl sulfides.

■ DO NOT discharge into sewer or waterways.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
allyl chloride	LOW	LOW	LOW	HIGH

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name /	EHS	TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Cas No /																	
RTECS No																	

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- 478 106 1 1 1 R 3 NI 1 0 2 1 3 T E 3
CAS:107-
05- 1 /
UC7350000

Legend:

EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acute aquatic toxicity LC/EC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acute mammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation & corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities,

For column A2: R=Readily biodegradable, NR=Not readily biodegradable.

For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lung injury, N=Neurotoxic, I=Immunotoxic.

For column E1: NT=Not tainting (tested), T=Tainting test positive.

For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances.

The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard.

(GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.

- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction,
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

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Section 14 - TRANSPORTATION INFORMATION



Labels Required: FLAMMABLE LIQUID, TOXIC

HAZCHEM:

☐ 3YE

Land Transport UNDG:

Class or division: 3
UN No.: 1100
Shipping Name: ALLYL CHLORIDE

Subsidiary risk: 6.1
UN packing group: I

Air Transport IATA:

ICAO/IATA Class: 3 (6.1)
UN/ID Number: 1100
Special provisions: None
Cargo Only
Packing Instructions: 303
Passenger and Cargo
Packing Instructions: Forbidden
Passenger and Cargo
Limited Quantity
Packing Instructions: -
Shipping Name: ALLYL CHLORIDE

ICAO/IATA Subrisk: None
Packing Group: I

Maximum Qty/Pack: 30 L
Passenger and Cargo
Maximum Qty/Pack: Forbidden
Passenger and Cargo
Limited Quantity
Maximum Qty/Pack: -

Maritime Transport IMDG:

IMDG Class: 3
UN Number: 1100
EMS Number: F- E, S- D
Limited Quantities: None
Shipping Name: ALLYL CHLORIDE

IMDG Subrisk: 6.1
Packing Group: I
Special provisions: None

GESAMP hazard profiles for this material can be found in section 12 of the MSDS.

Section 15 - REGULATORY INFORMATION

REGULATIONS

allyl chloride (CAS: 107-05-1) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "OECD Representative List of High Production Volume (HPV) Chemicals"

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Section 16 - OTHER INFORMATION

REPRODUCTIVE HEALTH GUIDELINES

■ Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for the reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
allyl chloride	3 mg/m3	NA	NA	NA	Yes

■ These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen
Jankovic J., Drake F.: A Screening Method for Occupational Reproductive
American Industrial Hygiene Association Journal 57: 641-649 (1996).

MSDS SECTION CHANGES

The following table displays the version number of and date on which each section was last changed.

Section Name	Version	Date	Section Name	Version	Date	Section Name	Version	Date
Advice to Doctor	5	28- Mar- 2009	Storage (storage incompatibility)	5	28- Mar- 2009	Instability Condition	5	28- Mar- 2009
First Aid (eye)	5	28- Mar- 2009	Storage (storage requirement)	5	28- Mar- 2009	Acute Health (eye)	5	28- Mar- 2009
First Aid (inhaled)	5	28- Mar- 2009	Storage (suitable container)	5	28- Mar- 2009	Acute Health (inhaled)	5	28- Mar- 2009
First Aid (skin)	5	28- Mar- 2009	Engineering Control	5	28- Mar- 2009	Acute Health (skin)	5	28- Mar- 2009
First Aid (swallowed)	5	28- Mar- 2009	Exposure Standard	5	28- Mar- 2009	Acute Health (swallowed)	5	28- Mar- 2009
Fire Fighter (extinguishing media)	5	28- Mar- 2009	Personal Protection (eye)	5	28- Mar- 2009	Chronic Health	5	28- Mar- 2009
Fire Fighter (fire fighting)	5	28- Mar- 2009	Personal Protection (hands/feet)	5	28- Mar- 2009	Environmental	5	28- Mar- 2009
Fire Fighter (fire incompatibility)	5	28- Mar- 2009	Personal Protection (other)	5	28- Mar- 2009	Disposal	5	28- Mar- 2009
Spills (major)	5	28- Mar- 2009	Appearance	5	28- Mar- 2009	Transport	5	28- Mar- 2009

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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.

Issue Date: 28-Mar-2018