SDFCL
s d fine-chem limited

ACETONITRILE

GHS Safety Data Sheet

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
ACETONITRILE

OTHER NAMES
C2-H3-N, CH3-CN, cyanomethane, ethanenitrile, "ethyl nitrile", "methane carbonitrile", "methyl cyanide"

PROPER SHIPPING NAME
ACETONITRILE

PRODUCT USE

- Reagent.

Used in the manufacture of Vitamin B, pharmaceuticals, perfumes, synthetic fibres and other chemicals including acetophenone and acetamidine. As a solvent to remove tars, phenols, and colouring matter from petroleum hydrocarbons not soluble in acetonitrile. Extracting fatty acids from fish liver oils and animal and vegetable oils. Can be used to recrystallise steroids. As a polar solvent where a rather high dielectric constant is required. As medium for promoting reactions involving ionization and as solvent in non-aqueous titrations As a non-aqueous solvent for inorganic salts.

SUPPLIER
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

continued...

Acute Aquatic Hazard Category 3
Acute Toxicity (Dermal) Category 4
Acute Toxicity (Inhalation) Category 3
Acute Toxicity (Oral) Category 2
Eye Irritation Category 2A
Flammable Liquid Category 2
Reproductive Toxicity Category 1B

EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by using GHS criteria:
H225 H300 H331 H312 H319 H360 H402
Highly flammable liquid and vapour
Fatal if swallowed
Toxic if inhaled
Harmful in contact with skin
Causes serious eye irritation
May damage the unborn child
Harmful 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.
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.

Response

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
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.

continued...

Call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.
If eye irritation persists: Get medical advice/attention.
Wash contaminated clothing before reuse.

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	%
acetonitrile	75-05-8	> 99

Section 4 - FIRST AID MEASURES

SWALLOWED

■ IMPORTANT: ESTABLISH A FIRST AID PLAN BEFORE WORKING WITH CYANIDES. ANTIDOTES SHOULD BE AV

- Prompt response in an emergency is vital.
- All workers are to be trained and refresher trained in procedures.
- Rescuers might need the protection of breathing apparatus where there is the potential of exposure to airborne cyanide.
- Use the buddy system and avoid becoming a casualty.

In all cases of cyanide exposure get medical help urgently after administering first aid.
For cyanide poisonings by any route:

- Contact Poisons Advisory Centre or a doctor.
- Seek immediate medical attention.
- Place casualty in coma position.
- Give oxygen when available.
- Consider external cardiac compression, mechanical resuscitation and use of antidote kit.

If breathing stops mouth-to-mouth resuscitation (also called expired air resuscitation - EAR) may be given only as a last resort. Should such resort prove necessary, first wash the casualty's mouth and lips. A first aid attendant giving EAR must not inhale the expired air of the casualty.

US Practice as employed by DuPont:-

FIRST AID Swallowed/ Inhaled /Skin Contact

- If no symptoms, no treatment is necessary; decontaminate patient.
- If conscious but with symptoms present (nausea, shortness of breath, dizziness) give oxygen.
- If consciousness is impaired (slurred speech, drowsiness) give oxygen and amyl nitrite.
- If unconscious but breathing, give oxygen and amyl nitrite by means of a respirator. To give amyl nitrite, break an ampoule in a cloth and insert into lip of mask for 15 seconds, then take away for 15 seconds. Repeat 5-6 times.

First Aid Supplies for cyanide poisoning should be conveniently placed throughout cyanide areas and should be IMMEDIATELY accessible at all times. They should be routinely inspected (typically daily) by people who would use them in an emergency. The total numbers of any item listed below should be adequate to handle the largest number of exposure cases that can reasonably be anticipated, taking into account that some supplies may be wasted, destroyed or inaccessible during an emergency.

Oxygen Resuscitators - The Flynn Series III Model from O-Two Systems has been found satisfactory, being

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lightweight, rugged and easy to use.

Amyl Nitrite Ampoules - One box of one dozen ampoules per station is usually satisfactory. Stations should be located throughout the cyanide area.
CAUTION: Amyl nitrite is not stable and must be replaced every 1 to 2 years. Store in the original dated box away from heat. (can be stored with the resuscitator).
Avoid storage on vehicles where cabin temperatures can reach 60 deg. C. Storage in high temperature climates may require replacement before the expiry date on the box. Also avoid excessive cold storage which may limit the vapour pressure and reduce its evaporating property. Kits and amyl nitrite should be accessible, but secured against tampering or theft (an increase in the use of nitrite "poppers", as aphrodisiacs, introduces substance abuse concerns).
A set of cyanide first aid instructions should be located at each amyl nitrite storage location. Workers should be fully trained since in real emergency situations there will be insufficient time to "read the book".
Notes on the use of amyl nitrite:-

- AN is highly volatile and flammable - do not smoke or use around a source of ignition.
- If treating patient in a windy or draughty area provide some shelter or protection (shirt, wall, drum, cupped hand etc.) to prevent amyl nitrite vapour from being blown away. Keep ampoule upwind from the nose , the objective is to get amyl nitrite into the patient's lungs.
- Rescuers should avoid AN inhalation to avoid becoming dizzy and losing competence.
- Lay the patient down. Since AN dilates blood vessels and lowers blood pressure, lying down will help keep the patient conscious.
- DO NOT overuse - excessive use might put the patient into shock.
- Vasodilatory effects of amyl nitrate may promote fatal cardiac arrhythmias (particularly if the patient is not really poisoned by cyanide).
- the role of amyl nitrate as a competitive inducer of methaemoglobin in the blood stream is highly variable and, alone, may produce levels of methaemoglobin as a low as 5% only.

Experience at DuPont plants has not shown any serious after-effects from treatment with amyl nitrite.

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.

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.

NOTES TO PHYSICIAN

■ For cyanide intoxication (and for certain nitriles which produce cyanide ion)

- Signs symptoms of acute cyanide poisoning reflect cellular hypoxia and are often non-specific.
- Cyanosis may be a late finding.
- A bradycardic, hypertensive and tachypneic patient suggests poisoning especially if CNS and cardiovascular depression subsequently occurs.
- Immediate attention should be directed towards assisted ventilation, administration of 100% oxygen, insertion of intravenous lines and institution of cardiac monitoring.

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- Obtain an arterial blood gas immediately and correct any severe metabolic acidosis (pH below 7.15).
- Mildly symptomatic patients generally require supportive care alone. Nitrites should not be given indiscriminately - in all cases of moderate to severe poisoning, they should be given in conjunction with thiosulfate. As a temporizing measure supply amyl nitrite perles (0.2ml inhaled 30 seconds every minute) until intravenous lines for sodium nitrite are established. 10 ml of a 3% solution is administered over 4 minutes to produce 20% methaemoglobin in adults. Follow directly with 50 ml of 25% sodium thiosulfate, at the same rate, IV. If symptoms reappear or persist within 1/2-1 hour, repeat nitrite and thiosulfate at 50% of initial dose. As the mode of action involves the metabolic conversion of the thiosulfate to thiocyanate, renal failure may enhance thiocyanate toxicity.
- Methylene blue is not an antidote. [Ellenhorn and Barceloux: Medical Toxicology]

If amyl nitrite intervention is employed then Medical Treatment Kits should contain the following:

- One box containing one dozen amyl nitrite ampoules
- Two sterile ampoules of sodium nitrite solution (10 mL of a 3% solution in each)
- Two sterile ampoules of sodium thiosulfate solution (50 mL of a 25% solution in each)
- One 10 mL sterile syringe. One 50 mL sterile syringe. Two sterile intravenous needles. One tourniquet.
- One dozen gauze pads.
- Latex gloves
- A "Biohazard" bag for disposal of bloody/contaminated equipment.
- A set of cyanide instructions on first aid and medical treatment.

- Notes on the use of amyl nitrite:-

- AN is highly volatile and flammable - do not smoke or use around a source of ignition.
- If treating patient in a windy or draughty area provide some shelter or protection (shirt, wall, drum, cupped hand etc.) to prevent amyl nitrite vapour from being blown away. Keep ampoule upwind from the nose, the objective is to get amyl nitrite into the patients lungs.
- Rescuers should avoid AN inhalation to avoid becoming dizzy and losing competence.
- Lay the patient down. Since AN dilates blood vessels and lowers blood pressure, lying down will help keep patient conscious.
- DO NOT overuse - excessive use might put the patient into shock. Experience at DuPont plants has not shown any serious after-effects from treatment with amyl nitrite.

ADDITIONAL NOTES:

- Major medical treatment procedures may vary e.g. US (FDA method as recommended by DuPont) uses amyl nitrite as a methaemoglobin generator, followed by treatment with sodium nitrite and then sodium thiosulfate.

MODES OF ACTION: Amyl nitrite (AN) reacts with haemoglobin (HB) to form about 5% methaemoglobin (MHB). Sodiu nitrite ($NaNO_2$) reacts with haemoglobin to form approximately 20-30% methaemoglobin. Methaemoglobin attracts cyanide ions (CN) from tissue and binds with them to become cyanmethaemoglobin (CNMHB). Sodium thiosulfate ($Na_2S_2O_3$) converts cyanmethaemoglobin to thiocyanate (HSCN) which is excreted by the kidneys. i.e. AN + HB = MHB $NaNO_2$ + HB = MHB CN + MHB = CNMHB $Na_2S_2O_3$ + CNMHB + O_2 = HSCN

- The administration of the antidote salts is intravenous in normal saline, Ringers lactate or other available IV fluid.
- European practice may use 4-dimethylaminophenol (DMAP) as a methaemoglobin generator. Also hydroxycobalamin (Vitamin B12a) is used. Hydroxycobalamin works by reacting with cyanide to form cyanocobalamin (Vitamin B12) which is excreted in the urine.
- European and Australian NOHSC (ASCC) propose dicobalt edetate (Kelocyanor) as antidote. This acts by chelating cyanide to form stable cobalticyanide, which is excreted in the urine. In all cases hyperbaric therapy may increase the efficiency of a cyanide antidote kit.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.

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- BCF (where regulations permit).
- Carbon dioxide.

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

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

Combustion products include: carbon dioxide ($CO2$), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

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

PERSONAL PROTECTION

Glasses:	Gloves:	Respirator:
Chemical goggles.	1.BUTYL 2.PE/EVAL/PE 3.PVA	Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■ Environmental hazard - contain spillage.

- 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.

Wipe up and absorb small quantities with a cloth or paper towel.
Allow to evaporate in a fume hood and burn the paper.
Flush area with large quantities of water.

MAJOR SPILLS

■ Environmental hazard - contain spillage.
Chemical Class: cyanides and nitriles
For release onto land: recommended sorbents listed in order of priority.

SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS

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LAND SPILL - SMALL

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

LAND SPILL - MEDIUM

sorbent clay - particulate	1	blower	skiploader	R, I, P
cross- linked polymer - particulate	2	blower	skiploader	R, W, SS
polypropylene - particulate	3	blower	skiploader	R, SS, DGC
expanded mineral - particulate	4	blower	skiploader	R, I, W, P, DGC
wood fiber - particulate	5	blower	skiploader	R, W, P, DGC
diatomite - particulate	6	blower	skiploader	R, I, W, P

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.

- DO NOT touch the spill material.
- 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.

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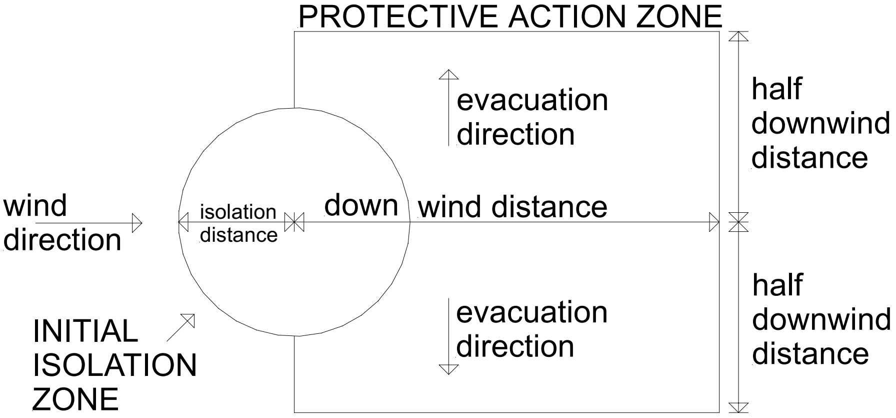
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

For alkyl nitriles:
For residue:

- Add alkaline hypochlorite solution to spill to produce cyanate.
- Neutralise liquid, and absorb with sawdust.
- Collect solid residues and seal in drums for disposal.
- Wash spill area with large quantities of water.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance	25 metres
Downwind Protection Distance	300 metres
IERG Number	17

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.

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

continued...

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.
- 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

- Glass container is suitable for laboratory quantities.
- 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 plastic box and the substances are not incompatible with the plastic.

STORAGE INCOMPATIBILITY

■ Acetonitrile

- forms cyanide gas on contact with steam
- reacts violently with oxidisers such as chlorine, bromine, fluorine; with chlorosulfonic acid, oleum or sulfuric acid
- is incompatible with water (especially if acid or alkaline), acids, caustics, nitrating agents, indium, nitrogen tetroxide , sulfur trioxide, iron(III) salts of perchlorate, nitrogen fluoride compounds
- attacks most rubber and plastics
- may accumulate electrical charges, causing ignition of vapours.
- Contact with acids produces toxic fumes.

WARNING:
May decompose violently or explosively on contact with other substances.

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- This substance is one of the relatively few compounds which are described as "endothermic" i.e. heat is absorbed into the compound, rather than released from it, during its formation.
- The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation.
- Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds.

BRETHERICK L.: Handbook of Reactive Chemical Hazards.

- Nitriles may polymerise in the presence of metals and some metal compounds.
- They are incompatible with acids; mixing nitriles with strong oxidising acids can lead to extremely violent reactions.
- Nitriles are generally incompatible with other oxidising agents such as peroxides and epoxides.
- The combination of bases and nitriles can produce hydrogen cyanide. Nitriles are hydrolysed exothermally in both aqueous acid and base to give carboxylic acids (or salts of carboxylic acids).
- Nitriles can react vigorously with reducing agents.
- The covalent cyano group is endothermic and many organic nitriles are reactive under certain conditions; N-cyano derivatives are reactive or unstable.
- The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation.
- Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds.

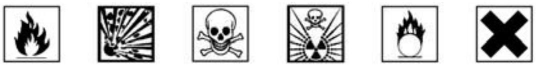
BRETHERICK L.: Handbook of Reactive Chemical Hazards.

- Avoid reaction with oxidising agents.

STORAGE REQUIREMENTS

- Outside or detached storage is preferred.
- 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



+	X	X	X	X	+

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

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Notes
Australia Exposure Standards	acetonitrile (Acetonitrile)	40	67	60	101	Sk

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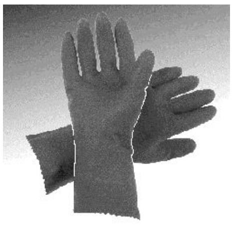
EMERGENCY EXPOSURE LIMITS

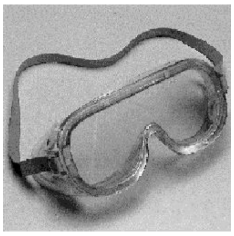
Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
acetonitrile		500

MATERIAL DATA

ACETONITRILE:
■ for acetonitrile:
Odour Threshold Value: 1161 ppm (detection)
Exposure at or below the TLV-TWA and STEL is thought to protect the worker against organic cyanide poisoning and injury to the respiratory tract and liver. Volunteers all detected odour at 40 ppm for the first two or three hours then experienced olfactory fatigue.
Odour Safety Factor (OSF)
OSF=0.034 (ACETONITRILE).
Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

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

■ 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.
for acetonitrile:
Butyl rubber, PVAL, Teflon, Saranex, Silvershield, Viton/ chlorobutyl are all highly resistant to permeation.

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- Butyl rubber gloves.
- Viton gloves.

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.

* Keep an antidote kit available where acetonitrile is used.

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: acetonitrile

■ Protective Material:

BUTYL	A
PE/EVAL/PE	A
SARANEX- 23	A
PVA	A
CPE	A
BUTYL/NEOPRENE	A
TEFLON	B
NEOPRENE	B
VITON/NEOPRENE	C
NATURAL+NEOPRENE	C
NATURAL RUBBER	C
NITRILE	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	A- AUS	-

continued...

1000	50	-	A- AUS
5000	50	Airline *	-
5000	100	-	A- 2
10000	100	-	A- 3
	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.

ENGINEERING CONTROLS

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

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	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.

continued...

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear, highly flammable liquid with an ether-like odour. Mixes with water, alcohols, esters, acetone, ether, acetamide solutions, chloroform, ethylene dichloride and many unsaturated hydrocarbons. Immiscible with many saturated hydrocarbons (petroleum fractions).

PHYSICAL PROPERTIES

Liquid.
Mixes with water.
Contact with acids liberates very toxic gas.

State	Liquid	Molecular Weight	41.05 Pure
Melting Range (°C)	- 45	Viscosity	Not Available
Boiling Range (°C)	81.1	Solubility in water (g/L)	Miscible
Flash Point (°C)	5.5 (OC)	pH (1% solution)	Not available.
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°C)	524.0	Vapour Pressure (kPa)	13.3 @ 27 deg.C
Upper Explosive Limit (%)	16.0	Specific Gravity (water=1)	0.8
Lower Explosive Limit (%)	4.4	Relative Vapour Density (air=1)	1.4
Volatile Component (%vol)	100	Evaporation Rate	5.79 BuAc=1
Gas group	IIA		

Material	Value
ACETONITRILE:	
log Kow	- 0.34

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of elevated temperatures.
- 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.

■ Cyanide poisoning can cause increased saliva output, nausea without vomiting, anxiety, confusion, vertigo, dizziness, stiffness of the lower jaw, convulsions, spasm, paralysis, coma and irregular heartbeat, and stimulation of breathing followed by failure. Often the skin becomes cyanosed (blue-grey), and this is often delayed. Doses which are not lethal are eventually excreted in the urine.

■ Nitrile poisoning exhibits similar symptoms to poisoning due to hydrogen cyanide. The substances irritate the eyes and skin, and are absorbed quickly and completely through the skin. The use of the term "organic nitriles" should be discouraged.

continued...

EYE

- There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain. There may be damage to the cornea. Unless treatment is prompt and adequate there may be permanent loss of vision. Conjunctivitis can occur following repeated exposure.

SKIN

- Skin contact with the material may be harmful; systemic effects may result following absorption.
- The material is not thought to be a skin irritant (as classified by EC Directives using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- 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 is suitably protected.

INHALED

- Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
- The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
- The smell of acetonitrile does not give enough warning of exposure. The gas is highly toxic, and inhaling it can cause loss of consciousness. Effects of inhalation exposure are headache, general weakness, with nausea, reduced pulse rate and blood pressure. Other symptoms include low body temperature, shallow breathing and cyanosis (a blue discolouration of the skin due to lack of oxygen). The peak effects may be delayed for several hours. Convulsions and collapse may follow. Exposure to concentrations of 160 ppm acetonitrile, in air, for 4 hours, has caused flushing of the face (2 hour delay following exposure) and bronchial tightness (5 hour delay).

Heavier exposures produced whole-body effects, ranging from headache, nausea, extreme tiredness to vomiting, chest or abdominal pain, depression of breathing, extreme weakness, stupor, convulsions, and in severe cases, depending on time and concentration, death.

CHRONIC HEALTH EFFECTS

- 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 exposure to cyanides and certain nitriles may result in interference to iodine uptake by thyroid gland and its consequent enlargement. This occurs following metabolic conversion of the cyanide moiety to thiocyanate. Thyroid insufficiency may also occur as a result of metabolic conversion of cyanides to the corresponding thiocyanate. Exposure to small amounts of cyanide compounds over long periods are reported to cause loss of appetite, headache, weakness, nausea, dizziness, abdominal pain, changes in taste and smell, muscle cramps, weight loss, flushing of the face, persistent runny nose and irritation of the upper respiratory tract and eyes. These symptoms are not specific to cyanide exposure and therefore the existence of a chronic cyanide toxicity remains speculative. Repeated minor contact with cyanides produce a characteristic rash with itching, papules (small, superficial raised spots on the skin) and possible sensitisation. Concerns have been expressed that low-level, long term exposures may result in damage to the nerves of the eye.

TOXICITY AND IRRITATION

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

TOXICITY	IRRITATION
Oral (human) TDLo: 570 mg/kg	Skin (rabbit):500 mg (open)- Mild
Oral (rat) LD50: 2730 mg/kg	Eye (rabbit):20 mg (open)- SEVERE
Inhalation (human) TCLo: 160 ppm/4h	
Inhalation (rat) LC50: 7551 mg/kg	

continued...

Inhalation (rabbit) LC50: 2828 ppm/4h
Dermal (rabbit) LD50: 1250 mg
Oral (Human) TDLo: 500 mg/kg
Oral (Human) TDLo: 800 mg/kg
Oral (Human) TDLo: 64 mg/kg
Oral (Rat) LD50: 2460 mg/kg
Intraperitoneal (Rat) LD50: 850 mg/kg
Subcutaneous (Rat) LD50: 3500 mg/kg
Intravenous (Rat) LD50: 1680 mg/kg
Oral (Mouse) LD50: 269 mg/kg
Intraperitoneal (Mouse) LD50: 175 mg/kg
Subcutaneous (Mouse) LD50: 4480 mg/kg
Intravenous (Mouse) LD50: 612 mg/kg
Inhalation (Dog) LC: 16000 ppm/4h
Oral (Cat) LD50: 200 mg/kg
Oral (Rabbit) LD50: 50 mg/kg
Subcutaneous (Rabbit) LD: 105 mg/kg
Oral (Guinea pig) LD50: 177 mg/kg
Inhalation (Guinea pig) LC50: 5655 ppm/4h

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

for acetonitrile:

Pharmacokinetics

Absorption - Absorption of acetonitrile occurs after oral, dermal, or inhalation exposure. Although no quantitative absorption data were found for oral exposure, signs of acute toxicity, observed after oral exposure, indicate that absorption occurs In humans, 74% of acetonitrile was absorbed from cigarette smo held in the mouth for 2 seconds; when inhaled into the lungs, absorption increased to 91% Dog inhalation to 16,000 ppm for 4 hours appeared to reach steady-state blood concentrations within 3-4 hours.

Distribution - Acetonitrile and its metabolites are transported throughout the body in the blood . After oral or inhalation exposures to experimental animals, parent compound or metabolites were found in the brain, heart, liver, kidney, spleen, blood, stomach, and muscle After a fatal human inhalation exposure, metabolites were also found in those organs as well as skin, lungs, intestine, testes, and urine . Metabolism - Acetonitrile is metabolised to hydrogen cyanide and thiocyanate which are responsible for the toxic effects of the chemical Metabolism is mediated by the cytochrome P-450 system

Excretion - Acetonitrile is excreted as the parent chemical in expired air and as parent or metabolite in urine Urinary excretion of thiocyanate following oral exposure in rats ranged from 11.8% (U.S. EPA 1985) to 37% of administered dose. Concentrations of acetonitrile of 2.2-20 microgram/100 mL of urine have been found for heavy smokers

Acute Toxicity

Acetonitrile liquid or vapor is irritating to the skin, eyes, and respiratory tract. At high enough doses, death can occur quickly from respiratory failure. Lower doses cause typical symptoms of cyanide poisoning such as salivation, nausea, vomiting, anxiety, confusion, hyperpnea, dyspnea, rapid pulse, unconsciousness, and convulsions.

Humans - Liquid or vapor acetonitrile is irritating to eyes, skin, nose, and throat . Concentrations of acetonitrile vapor up to 500 ppm cause irritation of mucous membranes . Volunteers were exposed to 40, 80, or 160 ppm for 4 hours; several hours after exposure one person had tightness of the chest after exposure to 40 ppm and another experienced flushing of the face and bronchial tightness after exposure to 160 ppm concentration of 160 ppm is roughly equivalent to a total of 19.5 mg/kg over the 4 hour period . One photographic laboratory worker died after "massive" exposure to acetonitrile vapor; gastric distress and nausea began about 4 hours after exposure followed by hypersalivation, conjunctivitis, low urine output, low blood pressure, albumin in urine and cerebrospinal fluid, coma, and death due to cardiac and respiratory failure . Similar signs and symptoms, including death, occurred in a worker painting the interior of a tank with a resin containing 30-40% acetonitrile

Animals - Oral LD50 values for acetonitrile in the rat range from 2.46 to 6.5 g/kg. The 4-hour inhalation LC50 varies with species from 2828 ppm in the rabbit to 16,000 ppm in the rat; dermal LD50 values of 3.9 and 1.25 g/kg have been reported for the rabbit Deaths occurred in dogs exposed by inhalation to 16,000 or 32 000 ppm; necropsy indicated pulmonary hemorrhage and vascular congestion

continued...

Subchronic/Chronic Toxicity
Limited information was found on the adverse effects of long term human exposure to acetonitrile. Animals exposed chronically by inhalation have liver vacuolisation, cerebral hemorrhage, lung lesions including focal emphysema and proliferation of alveolar septa, and decreases in hematological parameters. EPA has derived an oral reference dose (RfD) of 0.006 mg/kg/day for acetonitrile, based on adverse blood effects observed in animal inhalation studies. Confidence in this RfD is low
Humans - No information was found on the adverse effects of long term human exposure to acetonitrile. Chronic exposure to acetonitrile may cause headache, anorexia, dizziness, weakness, and macular, papular, or vesicular dermatitis.
Animals - Female mice exposed to 100, 200, or 400 ppm, 6 hours/day, 5 days/week for 90 days had thymic atrophy at the middle and high doses and hepatic vacuolisation at the high dose; dose-related decreases were observed in hematocrit, blood hemoglobin concentration, and erythrocyte and leucocyte counts A adverse effect level (NOAEL) for this study was 100 ppm (equivalent to 19.3 mg/kg/day). Based on these inhalation data the U.S. EPA calculated an oral reference dose for acetonitrile of 0.006 mg/kg/day. Similar hepatic and blood profile changes were observed in mice exposed to 200 or 400 ppm 6.5 hours/day, 5 days/week for 13 weeks Rats exposed by inhalation to 166, 330, or 655 ppm acetonitrile 7 hours/day, 5 days/week for 90 days had a dose-responsive increase in the severity of lung lesions. Animals in the low and middle dose groups had "histiocytic clumps in alveoli, atelectasis, bronchitis or pneumonia"; high dose animals had alveolar congestion and focal edema, bronchial inflammation, desquamation, and excess mucus as well as swelling of the liver and kidneys and cerebral hemorrhage. Dogs and monkeys exposed to 350 ppm, 7 hours/day, 5 days/week for 91 days had pulmonary lesions including focal emphysema, atelectasis and proliferation of alveolar septa; transient depression in haematocrit and hemoglobin values also occurred in dogs, and brain hemorrhages were observed in monkeys . Male and female mice (groups of 10/sex) were exposed to 25, 50, 100, 200, or 400 ppm, 6 hours/day for 65 days. Decreased BUN, red blood cell counts, and hematocrit occurred in females exposed to the two highest doses, and increased liver weights were observed in males at 400 ppm and females at 100 and 200 ppm
Genotoxicity
Acetonitrile was negative for mutations in Chinese hamster ovary cells and Salmonella strains TA98, TA100, TA1535, and TA1537 when assayed with or without metabolic activation . Developmental/Reproductive Toxicity
Acetonitrile causes a dose-related increase in early resorptions and fetal death in hamsters, rats, and rabbits. Neural tube defects also occur in hamsters after a single oral or inhalation exposure during early gestation.
Humans - No information was found in the secondary sources searched regarding the developmental or reproductive toxicity of acetonitrile to humans.
Animals - Hamsters (6 to 12/group) were administered a single oral dose of acetonitrile of 100, 200, 300, or 400 mg/kg on day 8 of gestation. At the 2 highest doses, increases in exencephaly, encephalocele, and rib malformations were observed; decreased fetal body weight occurred at all doses and an increase in resorptions occurred at 200 and 400 mg/kg . The same malformations occurred when hamsters were exposed by inhalation to 5000 or 8000 ppm for 1 hour on day 8 of gestation An increase in early resorptions also occurred in rats receiving 375 mg/kg/day by gavage on gestation days 6-19; no adverse effects were observed at 200 mg/kg/day . Rabbits given 2, 15, or 30 mg/kg/day acetonitrile by gavage on gestation days 6-18 had an increase in fetal death at the highest dose . No effects in sperm motility and morphology or in vaginal cytology was observed in rats or mice exposed to 400 ppm, 6 hours/day, 5 days/week for 13 weeks .
Neurotoxicity
Exposure to high concentrations of acetonitrile causes death by respiratory failure and has been shown to cause brain lesions in animals.
Humans - The nervous system is a major target for acetonitrile acute toxicity. Acute exposure may cause salivation, nausea, vomiting, anxiety, confusion, hyperpnea, dyspnea, rapid pulse, unconsciousness, and convulsions followed by death from respiratory failure. Chronic exposure may cause headache, anorexia, dizziness, and weakness
Animals - Acetonitrile inhalation caused cerebral hemorrhages in rats exposed to 655 ppm 7 hours/day, 5 days/week, for 90 days and monkeys exposed to 350 ppm 7 hours/day, 5 days/week, for 91 days.

SKIN

acetonitrile	Australia Exposure Standards - Skin	Notes	Sk

continued...

Section 12 - ECOLOGICAL INFORMATION

acetonitrile 96 hr LC50 (100) mg/L Fathead minnow Fish Source: Experimental

Refer to data for ingredients, which follows:

ACETONITRILE:

■ Hazardous Air Pollutant:	Yes
■ Fish LC50 (96hr.) (mg/l):	1000- 1850
■ log Kow (Prager 1995):	- 0.34
■ log Kow (Sangster 1997):	- 0.34
■ log Pow (Verschueren 1983):	- 0.34
■ Half- life Soil - High (hours):	672
■ Half- life Soil - Low (hours):	168
■ Half- life Air - High (hours):	12991
■ Half- life Air - Low (hours):	1299
■ Half- life Surface water - High (hours):	672
■ Half- life Surface water - Low (hours):	168
■ Half- life Ground water - High (hours):	8640
■ Half- life Ground water - Low (hours):	336
■ Aqueous biodegradation - Aerobic - High (hours):	672
■ Aqueous biodegradation - Aerobic - Low (hours):	168
■ Aqueous biodegradation - Anaerobic - High (hours):	2688
■ Aqueous biodegradation - Anaerobic - Low (hours):	672
■ Aqueous biodegradation - Removal secondary treatment - High (hours):	94%
■ Aqueous biodegradation - Removal secondary treatment - Low (hours):	27%
■ Photooxidation half- life water - High (hours):	1.10E+08
■ Photooxidation half- life water - Low (hours):	2.80E+06
■ Photooxidation half- life air - High (hours):	12991
■ Photooxidation half- life air - Low (hours):	1299
■ First order hydrolysis half- life (hours):	>150000YR
■ Base rate constant [MOH)- HR]- 1:	5.80E- 03

■ On the basis of available evidence concerning either toxicity, persistence, potential to accumulate and or observed environmental fate and behaviour, the material may present a danger, immediate or long-term and /or delayed, to the structure and/ or functioning of natural ecosystems.
■ DO NOT discharge into sewer or waterways.
■ for acetonitrile:
log Kow: -0.34
Koc: 16
Half-life (hr) air: 12840-20640
Henry's atm m3 /mol: 2.93E-05
BCF: 0.3
Log BCF: -0.34
Nitrification inhibition: nil at 100mg/L
Abiotic Effects: According to the definition provided in the U.S. Federal Register (1992), acetonitrile is a volatile organic compound (VOC) substance. As a VOC, acetonitrile can contribute to the formation of photochemical smog in the presence of other VOCs.
Transport: Acetonitrile is expected to adsorb weakly to soils as predicted by its KOC value; removal occurs primarily by volatilisation and leaching into groundwater . Volatilisation from surface waters is slow due to the high water solubility, moderate vapor pressure (91.1 mm Hg), and low Henry's law constant (3.46 x 10-5 atm.m3/mole) of the chemical. The water solubility of acetonitrile suggests that dissolution into clouds and raindrops may occur leading to possible removal in rainfall (wet deposition)
Air: Acetonitrile is unlikely to undergo direct photolysis in air. Degradation occurs by reaction with hydroxyl radicals and ozone. Estimated half-lives for reaction with hydroxyl radicals range from 0.6 days to about 20 days . Reaction with ozone is slower with estimated half-lives of 54 days and 76.4 days.
It persists in the troposphere and may be transported over long distances.
Soil: In soil, the material undergoes aerobic biodegradation; it is expected to be mobile in soil and may evaporate form surface soils. Acetonitrile is removed from soil by microbial degradation. Nocardia rhodochrus

continued...

LL100-21 and Aeromonas sp. BN 7013 isolated from soils are capable of utilising acetonitrile as a sole carbon and nitrogen source . The chemical is enzymatically hydrolysed by a strain of the fungus Fusarium solani . Evaporation and leaching are also important in removing acetonitrile from soils
Water: Acetonitrile is removed from water by biodegradation, with decomposition occurring about five times faster following acclimation of the microorganisms. Decomposition of the chemical in the Ohio River (0.1 to 25 mg/L) was 20% in 5 days and 40% in 12 days . Degradation occurs by Corynebacterium nitrilophilus isolated from activated sludge . Enzymatic hydrolysis is accomplished by Pseudomonas sp. capable of utilizing acetonitrile as a sole carbon source. Calculated volatisation half-lives from a typical pond and river are 11 days and 6 days, respectively. Although slow, loss by volatilisation may become more important in shallow waters.
Biota - Based on the high water solubility and very low calculated bioconcentration factor (0.3) of acetonitrile, bioaccumulation in aquatic organisms is not expected to be significant
Ecotoxicity:
Acetonitrile has low acute toxicity to aquatic organisms; toxicity values are greater than 100 mg/L. The Fish LC50 (96 h): fathead minnow (Pimephales promelas) 1020 mg/l, 1000 mg/l (hard and soft water respectively); bluegill (Lepomis macrochirus) 1850 mg/l; guppy (Lebistes reticulatus) 1650 mg/l
Invertebrate EC50:520-7300 mg/l (inhibition of cellular multiplication)
Drinking Water Standards: none available.
Soil Guidelines: none available.
Air Quality Standards: none available.
■ Soil Guidelines: Dutch Criteria:

free cyanide: 1 mg/kg (target)

20 mg/kg (intervention)

complex cyanide (pH 5): 5 mg/kg (target)

50 mg/kg (intervention)

Air Quality Standards: no safe guidelines recommended due to carcinogenic properties.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
acetonitrile	LOW	HIGH	LOW	HIGH

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / Cas No / RTECS No	EHS	TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
- CAS:75-05- 8 / AL7700000	16	69	0	0	0	R	1	NI	1	1	2	1	2			D	2

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=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acutemammalian 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=Lunginjury, N=Neurotoxic, I=Immunotoxic.

continued...

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.
- Care must be taken when using hypochlorite solution to destroy cyanide wastes by oxidation of cyanates because highly toxic cyanogen chloride may be formed.
- The reaction proceeds readily, even at high pH, but the secondary oxidation of cyanate to nitrogen and carbon dioxide is very pH dependent. At pH 11 it is slow but runs-away at pH 10-10.3. This procedure should avoid high pHs, excess of hypochlorite, and moderate or high concentrations of the hypochlorite.
- Addition of 0.5 ml of cyanide solution to 5 ml of stirred hypochlorite destroyed a gas meter with the violent evolution of gas.

BRETHERICK L.: Handbook of Reactive Chemical Hazards
CAUTION: Concentrated hypochlorite should not be mixed with concentrated cyanide solutions or solid cyanide because highly toxic cyanogen chloride gas will be released.
Waste solutions may also be reacted with ferrous sulfate to form relatively non-toxic ferrocyanide.

Section 14 - TRANSPORTATION INFORMATION

continued...

Labels Required: FLAMMABLE LIQUID

HAZCHEM:
*2YE Use alcohol resistant foam

Land Transport UNDG:

Class or division:	3	Subsidiary risk:	None
UN No.:	1648	UN packing group:	II

Shipping Name:ACETONITRILE

Air Transport IATA:

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	None
UN/ID Number:	1648	Packing Group:	II
Special provisions:	None		

Shipping Name: ACETONITRILE

Maritime Transport IMDG:

IMDG Class:	3	IMDG Subrisk:	None
UN Number:	1648	Packing Group:	II
EMS Number:	F- E, S- D	Special provisions:	None
Limited Quantities:	1 L		

Shipping Name: ACETONITRILE

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

Section 15 - REGULATORY INFORMATION

REGULATIONS

acetonitrile (CAS: 75-05-8) is found on the following regulatory lists;
"Australia Exposure Standards","Australia Hazardous Substances","Australia Illicit Drug Reagents/Essential Chemicals - Category III","Australia Inventory of Chemical Substances (AICS)","Australia National Pollutant Inventory","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances","OECD Representative List of High Production Volume (HPV) Chemicals"

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 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

continued...

acetonitrile	22.7 mg/m3	100	D	NA	-

■ 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
First Aid (eye)	4	19- Feb- 2007	Storage (storage incompatibility)	4	19- Feb- 2007	Acute Health (eye)	4	19- Feb- 2007
First Aid (inhaled)	4	19- Feb- 2007	Storage (storage requirement)	4	19- Feb- 2007	Acute Health (inhaled)	4	19- Feb- 2007
First Aid (skin)	4	19- Feb- 2007	Storage (suitable container)	4	19- Feb- 2007	Acute Health (skin)	4	19- Feb- 2007
First Aid (swallowed)	4	19- Feb- 2007	Engineering Control	4	19- Feb- 2007	Acute Health (swallowed)	4	19- Feb- 2007
Fire Fighter (extinguishing media)	4	19- Feb- 2007	Exposure Standard	4	19- Feb- 2007	Chronic Health	4	19- Feb- 2007
Fire Fighter (fire fighting)	4	19- Feb- 2007	Personal Protection (eye)	4	19- Feb- 2007	Toxicity and Irritation (Other)	4	19- Feb- 2007
Fire Fighter (fire incompatibility)	4	19- Feb- 2007	Personal Protection (hands/feet)	4	19- Feb- 2007	Toxicity and Irritation (Toxicity Figure)	4	19- Feb- 2007
Fire Fighter (fire/explosion hazard)	4	19- Feb- 2007	Appearance	4	19- Feb- 2007	Environmental	4	19- Feb- 2007
Spills (major)	4	19- Feb- 2007	Physical Properties	4	19- Feb- 2007	Disposal	4	19- Feb- 2007
Spills (minor)	4	19- Feb- 2007	Instability Condition	4	19- Feb- 2007	Transport	4	19- Feb- 2007
Handling Procedure	4	19- Feb- 2007						

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Classification committee using available literature references.

■ 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 doesnot represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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