

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 1 of 22

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

ACRYLIC ACID

OTHER NAMES

C3-H4-O2, H2C=CHCOOH, "2-propenoic acid", "2-propenoic acid", AA, "acrylic acid monomer inhibited", "propenoic acid", "vinylformic acid", "ethylenecarboxylic acid", "acroleic acid", "stenomeric acrylate"

PROPER SHIPPING NAME

ACRYLIC ACID, STABILIZED

PRODUCT USE

Monomer used in resins, rubbers, plastics; particularly polymers that are water soluble or used in water treatment processes, flocculants, etc. As a component of anaerobic adhesives. As an acid catalyst. Used for production of acrylic esters i.e. butyl acrylate, isobutyl esters.
Intermediate

SUPPLIER

Company: S D FINE - CHEM LIMITED

Address:

315- 317, T.V.IND.ESTATE,

248 WORLI ROAD,

MUMBAI- 400 030, INDIA

technical@sdfine.com

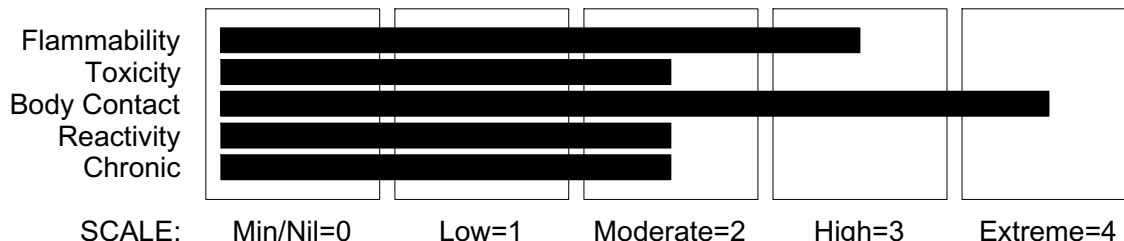
Telephone: 91- 22 24959898

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Section 2 - HAZARDS IDENTIFICATION

HAZARD RATINGS



GHS Classification

Acute Aquatic Hazard Category 1

Acute Toxicity (Dermal) Category 3

Acute Toxicity (Inhalation) Category 3

Acute Toxicity (Oral) Category 2

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 2 of 22

Section 2 - HAZARDS IDENTIFICATION

Flammable Liquid Category 2
Metal Corrosion Category 1
Serious Eye Damage Category 1
Skin Corrosion/Irritation Category 1B
Skin Sensitizer Category 1



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H225 H300 H311 H331 H317 H290 H314 H318 H400

Highly flammable liquid and vapour

Fatal if swallowed

Toxic in contact with skin

Toxic if inhaled

May cause allergic skin reaction

May be corrosive to metals

Causes severe skin burns and eye damage

Causes serious eye damage

Very toxic to aquatic life

PRECAUTIONARY STATEMENTS

Prevention

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

Keep container tightly closed.

Keep only in original container.

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.

Contaminated work clothing should not be allowed out of the workplace.

Avoid release to the environment.

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

Response

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

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

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.

Immediately call a POISON CENTER or doctor/physician.

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 3 of 22

Section 2 - HAZARDS IDENTIFICATION

Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.
If skin irritation or rash occurs: Get medical advice/attention.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
Absorb spillage to prevent material damage.
Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Store in corrosive resistant container or with a resistant inner liner.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
acrylic acid	79-10-7	99
inhibitor, may be		
4- methoxyphenol (MEHQ)	150-76-5	0.020
or		
hydroquinone	123-31-9	0.100 ^
less commonly use inhibitors are		
phenothiazine	92-84-2	0.10 ^
or		
methylene blue	61-73-4	0.5 ^
or		
N, N' - diphenyl- p- phenylenediamine	74-31-7	0.05 ^

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Transport to hospital or doctor without delay.

EYE

- If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 4 of 22

Section 4 - FIRST AID MEASURES

SKIN

- If skin or hair contact occurs:
 - Immediately flush body and clothes with large amounts of water, using safety shower if available.
 - Quickly remove all contaminated clothing, including footwear.
 - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
 - Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- 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.
- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
- Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

This must definitely be left to a doctor or person authorised by him/her.
(ICSC13719).

NOTES TO PHYSICIAN

- For acute or short term repeated exposures to strong acids:
 - Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
 - Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
 - Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
 - Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralising agents or any other additives. Several litres of saline are required.
 - Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
 - Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).
- [Ellenhorn and Barceloux: Medical Toxicology].

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 5 of 22

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- 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.
- 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), carbon monoxide (CO), nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.
- May emit corrosive fumes.

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.
- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.

MAJOR SPILLS

- Chemical Class:acidic compounds, organic
- For release onto land: recommended sorbents listed in order of priority.

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ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 6 of 22

Section 6 - ACCIDENTAL RELEASE MEASURES

SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
LAND SPILL - SMALL				
wood fiber - pillow	1	throw	pitchfork	R, P, DGC, RT
cross- linked	1	shovel	shovel	R, W, SS
polymer - particulate				
cross- linked	1	throw	pitchfork	R, DGC, RT
polymer - pillow				
sorbent clay - particulate	2	shovel	shovel	R, I, P
foamed glass - pillow	2	throw	pitchfork	R, P, DGC, RT
wood fiber - particulate	3	shovel	shovel	R, W, P, DGC
LAND SPILL - MEDIUM				
cross- linked	1	blower	skiploader	R, W, SS
polymer - particulate				
polypropylene - particulate	2	blower	skiploader	W, SS, DGC
sorbent clay - particulate	2	blower	skiploader	R, I, P
cross- linked	3	throw	skiploader	R, DGC, RT
polymer - pillow				
polypropylene - mat	3	throw	skiploader	W, SS, DGC
expanded mineral - particulate	3	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.

Environmental hazard - contain spillage.

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.

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ACRYLIC ACID

GHS Safety Data Sheet

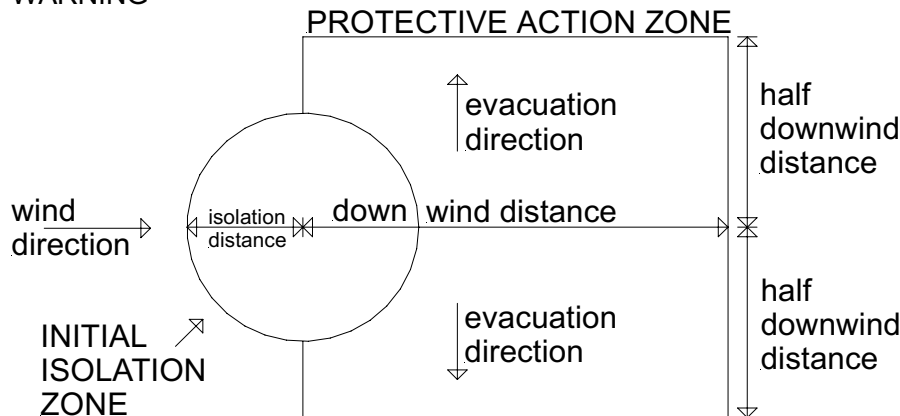
Version No:8
Page 7 of 22

Section 6 - ACCIDENTAL RELEASE MEASURES

- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL

WARNING



From IERG (Canada/Australia)

Isolation Distance	25 metres
Downwind Protection Distance	250 metres
IERG Number	19P

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 132P 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:
acrylic acid 750ppm

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
acrylic acid 50ppm

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 8 of 22

Section 6 - ACCIDENTAL RELEASE MEASURES

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

acrylic acid 2ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

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

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

The substance is a peroxidisable vinyl monomer that may exothermically polymerise as a result of decomposition of accumulated peroxides; that is, the peroxides initiate very energetic polymerisation of the bulk monomer

Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.

- A responsible person should maintain an inventory of peroxidisable chemicals or annotate the general chemical inventory to indicate which chemicals are subject to peroxidation. An expiration date should be determined. The chemical should either be treated to remove peroxides or disposed of before this date.
- The person or laboratory receiving the chemical should record a receipt date on the bottle. The individual opening the container should add an opening date.
- Unopened containers received from the supplier should be safe to store for 18 months.
- Opened containers of inhibited material should not be stored for more than 12 months; they should NOT be stored under an inert atmosphere. Generally, storage of inhibited vinyl monomers should be under air rather than nitrogen or other inert atmosphere, because customary inhibitors are phenolic compounds, which require oxygen for their action. Most vinyl monomers may be polymerized without removal of inhibitor by proper adjustment of initiator concentration, thus making the isolation of the more hazardous uninhibited material unnecessary.
- Opened containers of uninhibited material (>500 g) should not be stored for more than 24 hours; small samples (less than 10 g) may be stored longer than 24 hours with discretion. Generally storage of uninhibited vinyl monomers should be under nitrogen and below room temperatures. For storage in excess of 24 hours, a suitable inhibitor should be added, and its name and quantity should be placed on the label.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- 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 are maintained.
- 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.

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8
Page 9 of 22

Section 7 - HANDLING AND STORAGE

SUITABLE CONTAINER

- Lined metal can. Lined metal drum. Lined metal safety cans.
- Packing as supplied and/or recommended by manufacturer.
- Plastic lining or containers may only be used if approved for flammable liquid (non-polar type).
- Check that containers are clearly labelled and free from leaks.
- DO NOT use aluminium or galvanised containers.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- 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) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
 - Cans with friction closures and
 - low pressure tubes and cartridges
- may be used.

-

Where combination packages are used, and the inner packages are of glass, porcelain or stoneware, there must be sufficient inert cushioning material in contact with inner and outer packages unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

- Check regularly for spills and leaks.

STORAGE INCOMPATIBILITY

■ Acrylic acid:

- may polymerise explosively under the influence of light, heat or peroxides
- is incompatible with strong acids, alkalis, ammonia, amines, isocyanates, alkylene oxides, epichlorohydrin, oxidisers, toluenediamine, pyridine, methyl pyridine, n-methylpyrrolidone, 2-methyl-6-ethylaniline, aniline, ethylenediamine, 2-aminoethanol
- severely corrodes carbon steel and iron; attacks other metals
- may generate electrostatic charges due to low conductivity
- uninhibited vapours may polymerise in plug vents, confined spaces or flame arresters in storage tanks.
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.
- Segregate from alkalies, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.
- Avoid strong bases.

STORAGE REQUIREMENTS

- Store in approved flammable liquid storage area.
 - No smoking, naked lights/ignition sources.
 - 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.
 - Storage areas should be clearly identified, well illuminated, clear of obstruction and accessible only to trained and authorised personnel - adequate security must be provided so that unauthorised personnel do not have access.
 - Store in grounded, properly designed and approved vessels and away from incompatible materials
 - Store according to applicable regulations for flammable materials for storage tanks, containers, piping, buildings, rooms, cabinets, allowable quantities and minimum storage distances.
 - Use non-sparking ventilation systems, approved explosion proof equipment and intrinsically safe electrical systems.
 - Have appropriate extinguishing capability in storage area (e.g. portable fire extinguishers - dry chemical, foam or carbon dioxide) and flammable gas detectors.
 - Keep adsorbents for leaks and spills readily available
 - For bulk storages, consider use of floating roof or nitrogen blanketed vessels; where venting to atmosphere is possible, equip storage tank vents with flame arrestors; inspect tank vents during winter conditions for vapour/ ice build-up; storage tanks should be above ground and diked to hold entire contents
 - Observe manufacturer's storing and handling recommendations.
- Easily peroxidisable.

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 10 of 22

Section 7 - HANDLING AND STORAGE

- Products formed as a result of peroxidation are not only safety hazards but may chemically alter the chemical behavior of the parent compound.
- Should have a warning label affixed bearing the date of receipt in the laboratory and the date on which the container label is first opened, or laboratory synthesised materials are the responsibility of the individual chemist.
- **WARNING:** This product may form peroxides which themselves are not themselves particularly hazardous but which on decomposition may initiate explosive polymerisation of the bulk monomer (Trommsdorf effect).
- Should be evaluated every 12 months, redated if safe or else discarded.
- Quantities of uninhibited monomers exceeding 500 ml should not be stored for more than 24 hours.
- The oxidation of iodide to iodine or the conversion of colourless ferrothiocyanate to red ferrithiocyanate by peroxides are simple and convenient tests for most peroxides.
- Before distilling or evaporating a suitable polymerisation inhibitor should be added.
- Leave at least 10% bottoms.
- Use a shield when evaporating or distilling mixtures which may contain peroxidisable compounds.
- Store away from heat and light.
- Particular attention should be paid to the adequacy of the closure on storage containers.

Peroxides may be removed by;

- passing the material over a column of ordinary activated alumina (care should be taken in disposal of the activated alumina);
- shaking with a concentrated solution of ferrous salt (provided the carrier solvent is water-insoluble);
- agitation with an approximately equimolar mixture of ferrous sulfate and sodium bisulfate;
- commercial quantities may be treated with a 5% solution of aqueous sodium carbonate.

Jackson et al: Control of Peroxizable Compounds; Safety in the Chemical Laboratory, Journal of Chemical Education; Vol 47, 1970, pp A175-A188

- When solvents have been freed from peroxides by percolation through a column of activated alumina, the adsorbed peroxides must promptly be desorbed by treatment with polar solvents, methanol or water, which must in turn be discarded safely.***.
- Storage requires stabilising inhibitor content and dissolved oxygen content to be monitored. Refer to manufacturer's recommended levels.
- DO NOT overfill containers so as to maintain free head space above product.
- Blanketing or sparging with nitrogen or oxygen free gas will deactivate stabiliser.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: 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/m ³	Notes
Australia Exposure Standards	acrylic acid (Acrylic acid)	2	5.9	Sk
Australia Exposure Standards	4- methoxyphenol (MEHQ) (4-Methoxyphenol)		5	
Australia Exposure Standards	hydroquinone (Hydroquinone)		2	

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 11 of 22

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Source	Material	TWA ppm	TWA mg/m ³	Notes
Australia Exposure Standards	phenothiazine (Phenothiazine)		5	Sk

The following materials had no OELs on our records

- methylene blue: CAS:61- 73- 4 CAS:7220- 79- 3 CAS:1341- 90- 8 CAS:6476- 03- 5
CAS:12262- 49- 6 CAS:97130- 83- 1 CAS:105504- 42- 5 CAS: 121067- 62- 7
CAS:167498- 52- 4
- N, N' - diphenyl- p-phenylenediamine: CAS:74- 31- 7

MATERIAL DATA

ACRYLIC ACID:

- For acrylic acid:
Odour Safety Factor(OSF)
OSF=21 (ACRYLIC ACID).
For phenothiazine:

Industrial exposures at 15 to 48 mg/m³ has produced skin irritation and case reports of photosensitisation associated with phenothiazine have been published. Large oral doses may cause liver and kidney damage. Exposure at or below the recommended TLV-TWA is thought to decrease the risk of keratitis, skin discolouration and sensitisation in workers. Percutaneous absorption may produce local and systemic toxicity and the skin notation acknowledges this.

The recommended TLV-TWA for hydroquinone takes into account the toxicology of hydroquinone and experience of industrial exposures to benzenediols. Exposure at or below the limit is thought to minimise the risk to workers of eye injury, dermatitis and central nervous system effects. A short-term duration exposure value has not been recommended, because no quantitative data as to the levels of hydroquinone which produce eye irritation or more serious corneal changes has been identified.

For 4-methoxyphenol (MEHQ)

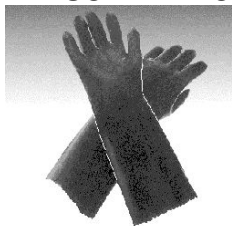
MEHQ has caused ocular toxicity in animals and skin depigmentation in rodents and workers. The recommendation for the TLV-TWA arises from documented eye and skin toxicities and by analogy with hydroquinone.

4-METHOXYPHENOL (MEHQ):

- For 4-methoxyphenol (MEHQ)

MEHQ has caused ocular toxicity in animals and skin depigmentation in rodents and workers. The recommendation for the TLV-TWA arises from documented eye and skin toxicities and by analogy with hydroquinone.

PERSONAL PROTECTION



EYE

- Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure
- Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted
- Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8
Page 12 of 22

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- of eyes; these afford face protection.
- Alternatively a gas mask may replace splash goggles and face shields.
 - 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

- Elbow length PVC gloves.
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

NOTE:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. 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.

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: acrylic acid

■ Protective Material CPI *.

BUTYL	A
SARANEX- 23	A
VITON	B
PE	C

■

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8
Page 13 of 22

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- 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	-
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

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. 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.)
---	--

continued...

ACRYLIC ACID

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

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

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

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

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Colourless, flammable, corrosive liquid with an acrid odour. Miscible with water, alcohol and ether. Reactive monomer and requires stabilising inhibitor for safe use, storage. Inhibitor free material may polymerise violently with fire/explosion risk. Inhibited material may polymerise if heated to 60 deg C..

PHYSICAL PROPERTIES

Liquid.
Mixes with water.
Corrosive.
Acid.

State	Liquid	Molecular Weight	72
Melting Range (°C)	13	Viscosity	Not Available
Boiling Range (°C)	141	Solubility in water (g/L)	Miscible
Flash Point (°C)	50 C.C.	pH (1% solution)	Not available.
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°C)	360	Vapour Pressure (kPa)	1.33 @ 39 C.
Upper Explosive Limit (%)	8.0	Specific Gravity (water=1)	1.05 @ 20 C
Lower Explosive Limit (%)	2.0	Relative Vapour Density (air=1)	2.5
Volatile Component (%vol)	Not available.	Evaporation Rate	0.27 BuAc=1

ACRYLIC ACID

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Polymerisation may occur at elevated temperatures.
- Polymerisation may be accompanied by generation of heat as exotherm.
- Process is self accelerating as heating causes more rapid polymerisation.
- Exotherm may cause boiling with generation of acrid, toxic and flammable vapour.
- Polymerisation and exotherm may be violent if contamination with strong acids, amines or catalysts occurs.
- Polymerisation and exotherm of material in bulk may be uncontrollable and result in rupture of storage tanks.
- Polymerisation may occur if stabilising inhibitor becomes depleted by aging.
- Stabilising inhibitor requires dissolved oxygen to be present in liquid for effective action.
- Specific storage requirements must be met for stability on ageing and transport.
- Contact with alkaline material liberates heat.

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

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- 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.
- Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Swelling of the epiglottis may make it difficult to breathe which may result in suffocation. More severe exposure may result in vomiting blood and thick mucus, shock, abnormally low blood pressure, fluctuating pulse, shallow respiration and clammy skin, inflammation of stomach wall, and rupture of oesophageal tissue. Untreated shock may eventually result in kidney failure. Severe cases may result in perforation of the stomach and abdominal cavity with consequent infection, rigidity and fever. There may be severe narrowing of the oesophageal or pyloric sphincters; this may occur immediately or after a delay of weeks to years. There may be coma and convulsions, followed by death due to infection of the abdominal cavity, kidneys or lungs.

EYE

- The material can produce severe chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.
- If applied to the eyes, this material causes severe eye damage.
- Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possibly irreversible damage. The appearance of the burn may not be apparent for several weeks after the initial contact. The cornea may ultimately become deeply opaque resulting in blindness.

SKIN

- The material can produce severe chemical burns following direct contact with the skin.
- Skin contact with the material may be harmful; systemic effects may result following absorption.
- The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.
- Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.
- Acrylic acid is a definite skin sensitiser by the guinea pig maximisation test but not by the Draize method.
- Open cuts, abraded or irritated skin should not be exposed to this material.

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Version No:8

Page 16 of 22

Section 11 - TOXICOLOGICAL INFORMATION

■ 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 can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
- Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Swelling of the lungs can occur, either immediately or after a delay; symptoms of this include chest tightness, shortness of breath, frothy phlegm and cyanosis. Lack of oxygen can cause death hours after onset.
- Acrylic acid vapour has a pronounced respiratory irritation effect and gives some warning of exposure. If irritation occurs seek to reduce exposure with ventilation, other control measures or use P.P.E., otherwise evacuate area.

The gastrointestinal tract is the major site of absorption of inhaled acrylic acid. Absorption involves dissolution in the mucous of the upper airways followed by mucociliary transport and finally ingestion.

Excretion appears to take place through expiration or via the renal system.

Exposure to irritant levels of acrylic acid decreased respiratory frequency, tidal volume and minute volume in unanaesthetised rats. In a fatal poisoning of a rat at 6000 ppm during a single 5 hour exposure autopsy revealed lung haemorrhage and degeneration of kidney tubules and liver. Rats exposed at 700 mg/m³ (238 ppm) for 4 hours/day for 5 weeks showed strong local irritation producing irreversible changes in eyes and skin, reduced body weight, increased reticulocyte counts and reduced urine concentrating capacity of the kidney. Inflammation of the upper respiratory tract and injury to gastric mucosa were also present.

CHRONIC HEALTH EFFECTS

- Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Chronic exposure may inflame the skin or conjunctiva.
- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
- There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
- Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
- There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

TOXICITY AND IRRITATION

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

TOXICITY

Inhalation (Rat) LC: 4000 ppm/4h
Intraperitoneal (Rat) LD50: 22 mg/kg
Oral (Mouse) LD50: 2400 mg/kg
Inhalation (Mouse) LC50: 5300 mg/m³/2h
Intraperitoneal (Mouse) LD50: 144 mg/kg
Subcutaneous (Mouse) LD50: 1590 mg/kg

IRRITATION

■ 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

continued...

ACRYLIC ACID

Section 11 - TOXICOLOGICAL INFORMATION

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. For acrylic acid:

Acute toxicity: Acrylic acid is absorbed via the lungs in animals and humans, absorption via the oral and dermal routes of exposure is demonstrated. In animals with solely nasal respiration, it is resorbed at the nasal mucosa. The extent of absorption depends on pH and solvent with direct dependence on substance concentration. In mice acrylic acid is rapidly and completely metabolised mainly in liver and kidney via the normal catabolic pathways of beta-oxidation. Elimination preferably occurs as carbon dioxide.

Pure acrylic acid is a very reactive chemical and accordingly exhibits severe corrosive properties in contact with biological material. Thus, acrylic acid causes acute harmful effects by oral and dermal exposure. Oral LD50 values for rats cover a range from 140 up to 1400 mg/kg bw depending on the concentration of the test substance. An oral LD50 of 1350 mg/kg bw was detected for male rats with a 10% aqueous solution of acrylic acid (pH 2.5) thus indicating that corrosive effects are not caused by the pH of the test substance. A dermal LD50 of 640 mg/kg bw was determined for rabbits (with undiluted acrylic acid). Acute inhalation toxicity is low because acrylic acid interacts with humidity of the air prior to reaching the depth of the respiratory tract. LC50 values of 3.6 to >5.1 mg/l/4 hours have been determined.

Workplace data demonstrate that acrylic acid causes skin corrosion and irritation of the respiratory tract in humans.

In tests with rabbits the pure acid caused severe burns to skin and eyes. Severe ocular damage caused by acrylic

acid cannot be avoided by neutralizing the acid.

Pure acrylic acid does not show skin sensitizing properties in animal sensitization tests. However, skin sensitization was observed in humans. This was attributed to oligomeric impurities in the raw material.

Respiratory sensitization has not been observed in humans.

Repeat dose toxicity: Repeated oral and inhalation exposure of acrylic acid to rats and mice resulted in dose related severe effects. Gavage on 90 days revealed dose-dependent mortality, irritation and ulceration of the stomach, and renal tubular necrosis in rats (LOAEL 150 mg/kg bw/d). No specific toxic effects were noted in subchronic and chronic drinking water studies. Reduced palatability (decreased water consumption) and unspecific signs of toxicity (decreased food consumption, body weight gain) at dosages >2000 ppm (100 mg/kg bw/d in male rats, 150 mg/kg bw/d in females) were observed. In a 90-day inhalation study, acrylic acid induced degenerative lesions on the olfactory mucosa in mice at 5 ppm (0.015 mg/l) and in rats at 75 ppm (0.221 mg/l). Mice seemed to be more sensitive than rats, thus a LOAEC of 5 ppm (0.015 mg/l) was derived for local effects. Long term dermal exposure at concentrations >1 % resulted in skin irritation.

Genotoxicity: Acrylic acid did not induce gene mutations in Salmonella or CHO cells (HPRT locus) but was clearly positive in the mouse lymphoma assay and in the in vitro chromosomal aberration test. In the mouse lymphoma assay small colonies were induced preferentially, thus the mutagenic potential of acrylic acid seems to be limited to clastogenicity. In vivo, acrylic acid did not induce mutagenic effects in either rat bone marrow cells or mouse germ cells after oral administration.

Carcinogenicity: There is no evidence that acrylic acid administered orally to rats or applied dermally to mice is carcinogenic. There are no cancer data available with respect to human exposure.

Reproductive and developmental toxicity: In oral studies on rats no effects on reproductive function (fertility) were observed. Some signs of postnatal developmental toxicity (retarded body weight gain of the pups) were seen following exposure of the parental generation at dose levels that led to reduced food intake and weight gain in the dams. No gross abnormalities were observed in the offspring. No prenatal developmental toxicity was observed in rats and rabbits following inhalation exposure.

The material may cause severe 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. Repeated exposures may produce severe ulceration.

4-METHOXYPHENOL (MEHQ):

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

TOXICITY

Oral (rat) LD50: 1600 mg/kg

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly

IRRITATION

Skin (rabbit): 6000 mg/12d- I Mild

continued...

ACRYLIC ACID

Section 11 - TOXICOLOGICAL INFORMATION

sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. 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.

CARCINOGEN

Acrylic acid	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
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SKIN

acrylic acid	Australia Exposure Standards - Skin	Notes	Sk
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Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

4-METHOXYPHENOL (MEHQ):

ACRYLIC ACID:

- DO NOT discharge into sewer or waterways.

ACRYLIC ACID:

■ Hazardous Air Pollutant:	Yes
■ Algae IC50 (72hr.) (mg/l):	41
■ Water solubility (g/l):	0.78
■ log Kow (Prager 1995):	0.36
■ log Kow (Sangster 1997):	0.35
■ log Pow (Verschueren 1983):	0.31/0.43
■ Half- life Soil - High (hours):	168
■ Half- life Soil - Low (hours):	24
■ Half- life Air - High (hours):	23.8
■ Half- life Air - Low (hours):	2.5
■ Half- life Surface water - High (hours):	168
■ Half- life Surface water - Low (hours):	24
■ Half- life Ground water - High (hours):	4320
■ Half- life Ground water - Low (hours):	48
■ Aqueous biodegradation - Aerobic - High (hours):	168
■ Aqueous biodegradation - Aerobic - Low (hours):	24
■ Aqueous biodegradation - Anaerobic - High (hours):	4320
■ Aqueous biodegradation - Anaerobic - Low (hours):	672
■ Photolysis maximum light absorption - High (nano- m):	250
■ Photooxidation half- life air - High (hours):	23.8
■ Photooxidation half- life air - Low (hours):	2.5

- 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 acrylic acid (AA):

log Koc: 1.42

Half-life (hr) air: 6.6

Henry's atm m3 /mol: 3.20E-07

continued...

ACRYLIC ACID

Section 12 - ECOLOGICAL INFORMATION

BOD 5 if unstated: 10-35%

BCF: 0.78

Environmental fate:

AA is fully miscible in water, has a vapour pressure of 3.8 hPa, and a log Pow of 0.46. The environmental behaviour of AA is determined by its range of 40 - 156 hours atmospheric half life and very low volatility. AA is readily biodegradable. Hydrolysis is not significant at all tested pHs (3, 7, 11). The average Kp value of 1.0 l/kg indicates no relevant adsorption onto sediment or soil. Based on the physico-chemical properties of AA, hydrosphere and to a much lower extent air are the preferred target compartments for distribution and neither relevant bioaccumulation nor geoaccumulation are expected. In waste water treatment plants (WWTPs) 87.3 % of the substance are estimated to be removed entirely by biodegradation.

Terrestrial Fate: If released on land, acrylic acid will leach into the ground and possibly biodegrade.

Aquatic Fate: If released into water, acrylic acid should readily biodegrade, although no rate data are available. Adsorption to sediment or volatilization will not be significant.

Atmospheric Fate: If released into the atmosphere, acrylic acid will react with photochemically produced hydroxyl radicals and ozone resulting in an estimated half-life of 6.6 hr.

Ecotoxicity:

Fish LC50 (24-96 h): 130-460 mg/l

Fish LC50 (96 h): *Onchorhynchus mykiss* 27 mg/l

Daphnia magna EC50 (48 h): 47 mg/l; NOEC (21 d): 7 mg/l

Alga EC50 (72 h): *Scenedesmus subspicatus* 0.13 mg/l; EC10 (92 h): 0.03 mg/l

Toxicity invertebrate: cell mult. inhib. 11-41mg/L

Bioaccumulation: not significant

Nitrif. inhib: nil at 10mg/L

Anaerobic effects: some degradation

Effects on algae and plankton: cell mult. inhib. 0.15-18mg/L

Degradation Biological: significant

processes Abiotic: photol, rxn OH*.

■ Prevent, by any means available, spillage from entering drains or water courses.

4-METHOXYPHENOL (MEHQ):

■ Fish LC50 (96hr.) (mg/l): 200 (48hr)

■ log Pow (Verschuereen 1983): 1.34

Degradation Biological: by soil microflora 16 days

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
acrylic acid	LOW	LOW	LOW	HIGH
4- methoxyphenol (MEHQ)	LOW		LOW	MED

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:79-10-7 / AS4375000	24	71	0	0	0	R	4	NI	2	2	2	3C	3			D	3

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=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

continued...

ACRYLIC ACID

Section 12 - ECOLOGICAL INFORMATION

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.
- Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus
- Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE, FLAMMABLE LIQUID

continued...

ACRYLIC ACID

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM:

☐ *2W Use alcohol resistant foam

Land Transport UNDG:

Class or division: 8
UN No.: 2218
Shipping Name: ACRYLIC ACID, STABILIZED

Subsidiary risk: 3
UN packing group: II

Air Transport IATA:

ICAO/IATA Class: 8 (3)
UN/ID Number: 2218
Special provisions: None
Shipping Name: ACRYLIC ACID, STABILIZED

ICAO/IATA Subrisk: None
Packing Group: II

Maritime Transport IMDG:

IMDG Class: 8
UN Number: 2218
EMS Number: F- E, S- C
Limited Quantities: 1 L
Shipping Name: ACRYLIC ACID, STABILIZED

IMDG Subrisk: 3
Packing Group: II
Special provisions: None

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

Section 15 - REGULATORY INFORMATION

REGULATIONS

acrylic acid (CAS: 79-10-7) is found on the following regulatory lists;

"Australia Dangerous Goods Code (ADG Code) - Goods Too Dangerous To Be Transported", "Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "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 Noxious Liquid Substances Carried in Bulk", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Air Transport Association (IATA) Dangerous Goods Regulations", "International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List", "OECD Representative List of High Production Volume (HPV) Chemicals"

Regulations for ingredients

4-methoxyphenol (MEHQ) (CAS: 150-76-5) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "OECD Representative List of High Production Volume (HPV) Chemicals"

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
methylene blue	61- 73- 4, 7220- 79- 3, 1341- 90- 8, 6476- 03- 5, 12262- 49- 6, 97130- 83- 1, 105504- 42- 5, 121067- 62- 7, 167498- 52- 4

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	7- Jan- 2006	Storage (storage requirement)	6	16- Aug- 2006	Acute Health (skin)	6	16- Aug- 2006
First Aid (eye)	4	6- Jan- 2006	Storage (suitable container)	6	16- Aug- 2006	Acute Health (swallowed)	6	16- Aug- 2006
First Aid (swallowed)	4	6- Jan- 2006	Engineering Control	4	6- Jan- 2006	Chronic Health	6	16- Aug- 2006

continued...

ACRYLIC ACID

GHS Safety Data Sheet

Page 22 of 22

Section 16 - OTHER INFORMATION

Fire Fighter (fire fighting)	4	6- Jan- 2006	Exposure Standard	4	6- Jan- 2006	Toxicity and Irritation (Irritation)	4	6- Jan- 2006
Fire Fighter (fire incompatibility)	4	6- Jan- 2006	Personal Protection (hands/feet)	6	16- Aug- 2006	Toxicity and Irritation (Other)	6	16- Aug- 2006
Fire Fighter (fire/explosion hazard)	6	16- Aug- 2006	Appearance	6	16- Aug- 2006	Toxicity and Irritation (Toxicity Figure)	6	16- Aug- 2006
Spills (major)	6	16- Aug- 2006	Physical Properties	4	6- Jan- 2006	Environmental	4	6- Jan- 2006
Spills (minor)	4	6- Jan- 2006	Instability Condition	6	16- Aug- 2006	Disposal	6	16- Aug- 2006
Handling Procedure	6	16- Aug- 2006	Acute Health (eye)	6	16- Aug- 2006	Transport	6	16- Aug- 2006
Storage (storage incompatibility)	6	16- Aug- 2006	Acute Health (inhaled)	5	7- Jan- 2006			

■ 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.

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