

# SOLVENT FOR MALIC ACID BY TLC

Hazard Alert Code: HIGH

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 1 of 17

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

SOLVENT FOR MALIC ACID BY TLC

### SYNONYMS

TLC-125mL

### PROPER SHIPPING NAME

FLAMMABLE LIQUID, CORROSIVE, N.O.S.(contains isobutyl acetate)

### PRODUCT USE

General laboratory reagent.

### SUPPLIER

Company: Vintessential Laboratories

Address:

13/143 Pt. Nepean Road

Dromana

VIC, 3936

Australia

Telephone: +61 3 5987 2242

 Emergency Tel: **+61 414 892 211**

 Emergency Tel: **+61 409 872 0242**

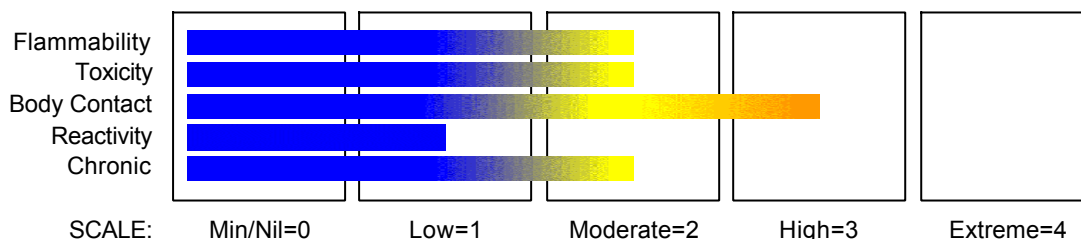
Fax: +61 3 5987 3303

## Section 2 - HAZARDS IDENTIFICATION

### STATEMENT OF HAZARDOUS NATURE

**HAZARDOUS SUBSTANCE. DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.**

### CHEMWATCH HAZARD RATINGS



continued...

## Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 2 of 17

Section 2 - HAZARDS IDENTIFICATION

**POISONS SCHEDULE**

None

**RISK**

- Flammable.
- Harmful in contact with skin.
- Causes burns.
- Risk of serious damage to eyes.
- HARMFUL - May cause lung damage if swallowed.
- Inhalation and/or ingestion may produce health damage\*.
- Cumulative effects may result following exposure\*.
- Vapours potentially cause drowsiness and dizziness\*.

\* (limited evidence).

**SAFETY**

- Keep locked up.
- Do not breathe gas/ fumes/ vapour/ spray.
- Avoid contact with eyes.
- Wear suitable protective clothing.
- Use only in well ventilated areas.
- Keep container in a well ventilated place.
- To clean the floor and all objects contaminated by this material use water.
- Keep container tightly closed.
- Take off immediately all contaminated clothing.
- In case of accident or if you feel unwell IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).
- This material and its container must be disposed of as hazardous waste.

**Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS**

| NAME                | CAS RN   | %     |
|---------------------|----------|-------|
| isobutyl acetate    | 110-19-0 | >60   |
| acetic acid glacial | 64-19-7  | 30-60 |

**Section 4 - FIRST AID MEASURES****SWALLOWED**

- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
- 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

continued...

**Chemwatch Material Safety Data Sheet (REVIEW)**

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 3 of 17

Section 4 - FIRST AID MEASURES

minutes.

- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

**SKIN**

■ If skin or hair contact occurs:

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

**INHALED**

- 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).

- 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 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 dessicating 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).

**continued...**

**Chemwatch Material Safety Data Sheet (REVIEW)**

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 4 of 17

**Section 4 - FIRST AID MEASURES**

[Ellenhorn and Barceloux: Medical Toxicology].

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

**Section 5 - FIRE FIGHTING MEASURES****EXTINGUISHING MEDIA**

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

**FIRE FIGHTING**

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- 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.
- Equipment should be thoroughly decontaminated after use.

**FIRE/EXPLOSION HAZARD**

- Liquid and vapour are flammable.
- Moderate fire and explosion hazard when exposed to heat or flame.
- Vapour may travel a considerable distance to source of ignition.
- Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
- Heating may cause expansion or decomposition leading to violent rupture of rigid containers.
- May emit corrosive fumes.

Combustion products include: carbon dioxide (CO<sub>2</sub>), 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.

**HAZCHEM**

•3W

**PERSONAL PROTECTION**

Glasses:

Full face- shield.

Gloves:

1.BUTYL 2.NEOPRENE 3.PE 4.PVC

Respirator:

Type AB Filter of sufficient capacity

continued...

## Section 6 - ACCIDENTAL RELEASE MEASURES

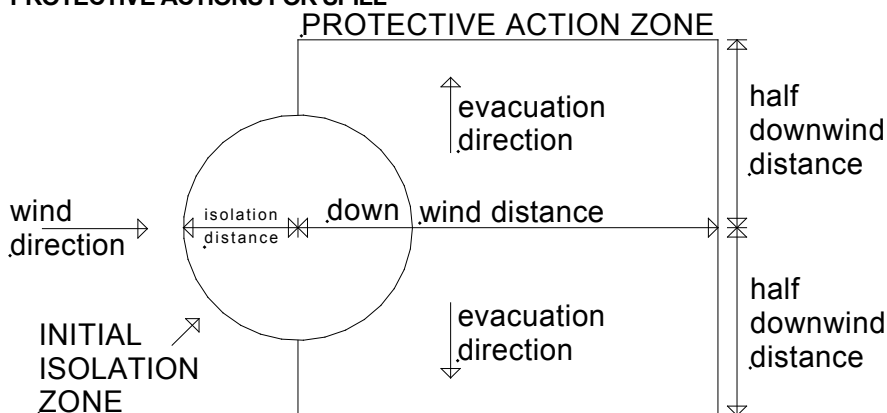
### MINOR SPILLS

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

### MAJOR SPILLS

- 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.
- 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 vapour.
- Contain or absorb spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- 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



From IERG (Canada/Australia)

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

### FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

**Chemwatch Material Safety Data Sheet (REVIEW)****Issue Date: 16-Apr-2010****NC317TCP****CHEMWATCH 4642-78****Version No:4****CD 2010/2 Page 6 of 17****Section 6 - ACCIDENTAL RELEASE MEASURES**

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 132 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:

acetic acid glacial 250ppm

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

acetic acid glacial 35ppm

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

acetic acid glacial 5ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

|                 |          |               |         |
|-----------------|----------|---------------|---------|
| Very Toxic (T+) | >= 0.1%  | Toxic (T)     | >= 3.0% |
| R50             | >= 0.25% | Corrosive (C) | >= 5.0% |
| R51             | >= 2.5%  |               |         |
| else            | >= 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.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of overexposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid generation of static electricity.
- DO NOT use plastic buckets.
- Earth all lines and equipment.
- Use spark-free tools when handling.

continued...

## Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 7 of 17

Section 7 - HANDLING AND STORAGE

- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

**SUITABLE CONTAINER**

- Glass container is suitable for laboratory quantities.

**STORAGE INCOMPATIBILITY**

- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.
- Avoid strong bases.
- Avoid reaction with oxidising agents.

**STORAGE REQUIREMENTS**

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

In addition, for tank storages (where appropriate):

- Store in grounded, properly designed and approved vessels and away from incompatible materials.
- 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.

**SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS**

+



+



+



+



X



+

+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010  
NC317TCP

CHEMWATCH 4642-78  
Version No:4  
CD 2010/2 Page 8 of 17

**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

**EXPOSURE CONTROLS**

| Source                       | Material                            | TWA ppm | TWA mg/m <sup>3</sup> | STEL ppm | STEL mg/m <sup>3</sup> | Peak ppm | Peak mg/m <sup>3</sup> | TWA F/CC | Notes |
|------------------------------|-------------------------------------|---------|-----------------------|----------|------------------------|----------|------------------------|----------|-------|
| Australia Exposure Standards | isobutyl acetate (Isobutyl acetate) | 150     | 713                   |          |                        |          |                        |          |       |
| Australia Exposure Standards | acetic acid glacial (Acetic acid)   | 10      | 25                    | 15       | 37                     |          |                        |          |       |

**EMERGENCY EXPOSURE LIMITS**

| Material            | Revised IDLH Value (mg/m3) | Revised IDLH Value (ppm) |
|---------------------|----------------------------|--------------------------|
| isobutyl acetate    |                            | 1,300 [LEL]              |
| acetic acid glacial |                            | 50                       |

**NOTES**

Values marked LEL indicate that the IDLH was based on 10% of the lower explosive limit for safety considerations even though the relevant toxicological data indicated that irreversible health effects or impairment of escape existed only at higher concentrations.

**ODOUR SAFETY FACTOR (OSF)**

OSF=21 ("ACETIC ACID, GLACIAL")

■ Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

| Class | OSF     | Description   |
|-------|---------|---|
| A     | 550     | Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities |
| B     | 26- 550 | As " A" for 50- 90% of persons being distracted   |
| C     | 1- 26   | As " A" for less than 50% of persons being distracted   |
| D     | 0.18- 1 | 10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached  |
| E     | <0.18   | As " D" for less than 10% of persons aware of being tested  |

**MATERIAL DATA**

SOLVENT FOR MALIC ACID BY TLC:

Not available

continued...

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010  
NC317TCP

CHEMWATCH 4642-78  
Version No:4  
CD 2010/2 Page 9 of 17

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

**ISOBUTYL ACETATE:**

- For isobutanol:

Odour Threshold Value: 0.66-40 ppm (detection), 1.8-53 ppm (recognition) Although there do not appear to be reports of isobutyl alcohol causing auditory impairment or vestibular damage in humans (as with n-butanol) the recommended TLV-TWA recognises the slightly greater acute toxic potential of isobutanol versus n-butanol. Exposure at or below this limit is thought to significantly reduce the risk of skin irritation.

Odour Safety Factor (OSF)

OSF=31 (ISOBUTYL ALCOHOL).

for isobutyl acetate:

Odour Threshold Value: 0.40-0.44 ppm (recognition)

The TLV-TWA is identical with that of n-butyl acetate and is thought to minimise the potential for ocular and upper respiratory tract irritation.

Exposed individuals are reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class A or B.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

| Class | OSF     | Description   |
|-------|---------|---|
| A     | 550     | Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities |
| B     | 26- 550 | As " A" for 50- 90% of persons being distracted   |
| C     | 1- 26   | As " A" for less than 50% of persons being distracted   |
| D     | 0.18- 1 | 10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached  |
| E     | <0.18   | As " D" for less than 10% of persons aware of being tested  |

**ACETIC ACID GLACIAL:**

- for acetic acid:

NOTE:Detector tubes for acetic acid, measuring in excess of 1 ppm, are commercially available.

Exposure at or below the TLV-TWA and TLV-STEL is thought to protect the worker against conjunctival, nose and respiratory tract irritation.

Odour Safety Factor(OSF)

OSF=21 ("ACETIC ACID, GLACIAL").

**PERSONAL PROTECTION**

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

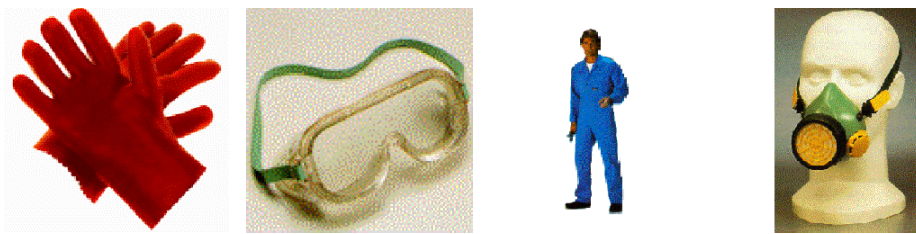
NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 10 of 17

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION



### EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

### HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber.
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

### OTHER

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

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

### ENGINEERING CONTROLS

- Use in a well-ventilated area.

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:  
 solvent, vapours, degreasing etc., evaporating from tank (in still air).  
 aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)

Air Speed:  
 0.25- 0.5 m/s (50- 100 f/min.)  
 0.5- 1 m/s (100- 200 f/min.)

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 11 of 17

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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

- 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

Clear, colourless acidic flammable liquid; mixes with water.

### PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Acid.

|                           |               |                                 |                |
|---------------------------|---------------|---------------------------------|----------------|
| State                     | Liquid        | Molecular Weight                | Not Applicable |
| Melting Range (°C)        | Not Available | Viscosity                       | Not Available  |
| Boiling Range (°C)        | Not Available | Solubility in water (g/L)       | Miscible       |
| Flash Point (°C)          | <61           | pH (1% solution)                | Not Available  |
| Decomposition Temp (°C)   | Not Available | pH (as supplied)                | Not Available  |
| Autoignition Temp (°C)    | Not Available | Vapour Pressure (kPa)           | Not Available  |
| Upper Explosive Limit (%) | Not Available | Specific Gravity (water=1)      | Not Available  |
| Lower Explosive Limit (%) | Not Available | Relative Vapour Density (air=1) | Not Available  |
| Volatile Component (%vol) | Not Available | Evaporation Rate                | Not Available  |

isobutyl acetate

■ log Kow (Sangster 1997):

1.78

acetic acid glacial

■ log Kow (Prager 1995):

- 0.31

■ log Kow (Sangster 1997):

- 0.17

continued...

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 12 of 17

**Section 10 - CHEMICAL STABILITY****CONDITIONS CONTRIBUTING TO INSTABILITY**

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

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

**Section 11 - TOXICOLOGICAL INFORMATION****POTENTIAL HEALTH EFFECTS****ACUTE HEALTH EFFECTS****SWALLOWED**

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

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

The main effects of simple esters are irritation, stupor and insensibility. Headache, drowsiness, dizziness, coma and behavioural changes may occur. Respiratory symptoms may include irritation, shortness of breath, rapid breathing, throat inflammation, bronchitis, lung inflammation and pulmonary oedema, sometimes delayed. Nausea, vomiting, diarrhoea and cramps are observed. Liver and kidney damage may result from massive exposures.

Ingestion of low-molecular organic acid solutions may produce spontaneous haemorrhaging, production of blood clots, gastrointestinal damage and narrowing of the oesophagus and stomach entry.

**EYE**

- The material can produce 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.

Solutions of low-molecular weight organic acids cause pain and injury to the eyes.

**SKIN**

- Skin contact with the material may be harmful; systemic effects may result following absorption.

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

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 quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary oedema.

The main effects of simple esters are irritation, stupor and insensibility. Headache, drowsiness, dizziness, coma and behavioural changes may occur. Respiratory symptoms may include irritation, shortness of breath, rapid breathing, throat inflammation, bronchitis, lung inflammation and pulmonary oedema, sometimes delayed. Nausea, vomiting, diarrhoea and cramps are observed. Liver and kidney damage may result from massive exposures.

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.

Acute effects from inhalation of high vapour concentrations may be chest and nasal irritation with coughing, sneezing, headache and even nausea.

**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.

continued...

## Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 13 of 17

## Section 11 - TOXICOLOGICAL INFORMATION

Chronic exposure may inflame the skin or conjunctiva.

Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.

As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

**TOXICITY AND IRRITATION**

ACETIC ACID GLACIAL:

ISOBUTYL ACETATE:

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

■ Not available. Refer to individual constituents.

ISOBUTYL ACETATE:

## TOXICITY

Oral (rat) LD50: 13400 mg/kg

Inhalation (Rat) LC: 8000 ppm/4h

Oral (Rabbit) LD50: 4763 mg/kg

■ The material may produce moderate eye irritation leading to 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.

Inhalation (rat): 8000ppm/4h

Dermal (rabbit): 20000 mg/kg

## IRRITATION

Skin(rabbit): 500 mg Open Mild

Skin(rabbit): 500 mg/24hr moderate

Eye(rabbit): 500 mg/24hr moderate

ACETIC ACID GLACIAL:

## TOXICITY

Oral (human) TDLo: 1.47 mg/kg

Unreport (man) LDLo: 308 mg/kg

Oral (rat) LD50: 3310 mg/kg

Inhalation (human) TLo: 816 ppm/3 min

Inhalation (rat) LLo: 16000 ppm/4 hr

Dermal (rabbit) LD50: 1060 mg/kg

## IRRITATION

Skin (human):50mg/24hr - Mild

Skin (rabbit):525mg (open)- SEVERE

Eye (rabbit): 0.05mg (open)- SEVERE

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. 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 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.

NOAELs following repeated exposure to acetic acid and its salts range from 210 mg/kg bw/day (2-4 month acetic acid drinking water study; systemic toxicity) to 3600 mg/kg bw/day (acetic acid, sodium salt, 4 week dietary study; no effects reported). Signs of irritation/corrosion at the site of contact as well as systemic toxicity have been reported. Prolonged inhalation exposure to acetic acid results in muscle imbalance,

continued...

## Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 14 of 17

## Section 11 - TOXICOLOGICAL INFORMATION

increase in blood cholinesterase activity, decreases in albumins and decreased growth at concentrations greater than 0.01 mg/m<sup>3</sup>/day.

Groups of 20 mice/sex were given 0.025% sodium acetate in drinking water (about 60 mg/kg bw/day) for 1 week before breeding, during a 9-day breeding period and (females only) throughout pregnancy, lactation and until the offspring were weaned at 3 weeks of age. No effects on fertility were observed. The male offspring were given the same solution until they were 5-7 weeks old and were then examined in a 24-hour activity test.

Examination of the litters revealed no overt deformities and normal pup weights at day 1 and day 21. The activity of offspring of the treated group was lower than that of controls during the first 12 hours but was similar during the second 12 hours. It is unknown if the decreased activity observed in the sodium acetate treated group was a result of exposure in utero and/or post-weaning, since the pups were exposed during both time periods. Acetic acid had no effects on implantation or on maternal or fetal survival in rats, mice or rabbits dosed via gavage during gestation days 6-19 at doses up to 1600 mg/kg/day. The number of abnormalities seen in either soft or skeletal tissues of the test groups did not differ from the number occurring in the controls. Sodium acetate had no effect on pregnant mice or offspring when mice were administered 1000 mg/kg bw, by gavage on days 8-12 of gestation.

## Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

ISOBUTYL ACETATE:

ACETIC ACID GLACIAL:

SOLVENT FOR MALIC ACID BY TLC:

- DO NOT discharge into sewer or waterways.

ISOBUTYL ACETATE:

- Algae IC<sub>50</sub> (72hr.) (mg/l): 205

- log Kow (Sangster 1997): 1.78

Half-life (hr) air: 11.5

Half-life (hr) H<sub>2</sub>O surface water: 47-564Henry's atm m<sup>3</sup> /mol: 1.69E-05

BCF: 2.1

Toxicity invertebrate: cell mult. inhib. 200-727mg/L

Bioaccumulation: not sig

Effects on algae and plankton: cell mult. inhib. algae 80-205mg/L

Degradation Biological: some

processes Abiotic: hydrol, RxnOH\*

ACETIC ACID GLACIAL:

- Fish LC<sub>50</sub> (96hr.) (mg/l): 88, 92

- Daphnia magna EC<sub>50</sub> (48hr.) (mg/l): 32

- Algae IC<sub>50</sub> (72hr.) (mg/l): 90

- log Kow (Prager 1995): -0.31

- log Kow (Sangster 1997): -0.17

- log Pow (Verschueren 1983): 1.8E+0

- Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC<sub>50</sub> at about pH 3.5.

■ Acetic acid and its salts (the acetates) can be grouped together because of their close structural relationships, their natural occurrence in plants and animals, and their fundamental role in cell metabolism, particularly in the tricarboxylic acid cycle (also known as the citric acid or Krebs's cycle), which is where

continued...

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 15 of 17

Section 12 - ECOLOGICAL INFORMATION

humans get their energy.

- Acetic acid is degraded photochemically in the atmosphere to produce hydroxyl radicals (estimated typical half-life of 22 days). Physical removal of acetates on atmospheric particulates may occur via wet or dry deposition.
- Natural water will neutralise dilute solutions of acetic acid.
- Spills of acetic acid on soil will readily biodegrade - the biodegradation rate for acetic acid after 14 days under aerobic conditions is 74 days.
- In invertebrates the toxicity of acetic acid (EC50 = 50-450 mg/L, depending on test species) -under static conditions, the 48 hour EC50 value for acetic acid is 65 mg/L for aquatic invertebrates (the test media was not neutralised). When the test solutions are neutralised, to form acetates, the static 48 hour EC50 for acetic acid is 6000 mg/L. In renewal systems with aquatic invertebrates, 48 hour EC50s for acetic acid are 100 mg/L and 180 mg/L.
- Fish LC50 (96 h): 75-88 mg/L.
- Acetic acid is not expected to bioconcentrate in the aquatic system.
- Low concentrations of acetic acid are harmful to fish.
- Drinking water standards: none available.
- Soil Guidelines: none available.
- Air Quality Standards: none available.
- Prevent, by any means available, spillage from entering drains or water courses.

### Ecotoxicity

| Ingredient          | Persistence:<br>Water/Soil | Persistence: Air | Bioaccumulation | Mobility |
|---------------------|----------------------------|------------------|-----------------|----------|
| isobutyl acetate    | LOW                        |                  | LOW             | HIGH     |
| acetic acid glacial | LOW                        |                  | LOW             | HIGH     |

## Section 13 - DISPOSAL CONSIDERATIONS

- 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.
- 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.

## Section 14 - TRANSPORTATION INFORMATION



continued...

# SOLVENT FOR MALIC ACID BY TLC

Hazard Alert Code: HIGH

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 16 of 17

Section 14 - TRANSPORTATION INFORMATION

Labels Required: FLAMMABLE LIQUID,CORROSIVE

## HAZCHEM:

●3W (ADG7)

## Land Transport UNDG:

Class or division: 3 Subsidiary risk: 8  
UN No.: 2924 UN packing group: III  
Shipping Name:FLAMMABLE LIQUID, CORROSIVE, N.O.S. (contains isobutyl acetate)

## Air Transport IATA:

|                                      |      |                                      |      |
|--------------------------------------|------|--------------------------------------|------|
| ICAO/IATA Class:                     | 3    | ICAO/IATA Subrisk:                   | 8    |
| UN/ID Number:                        | 2924 | Packing Group:                       | III  |
| Special provisions:                  | A3   |                                      |      |
| Cargo Only                           |      |                                      |      |
| Packing Instructions:                | 310  | Maximum Qty/Pack:                    | 60 L |
| Passenger and Cargo                  |      | Passenger and Cargo                  |      |
| Packing Instructions:                | 309  | Maximum Qty/Pack:                    | 5 L  |
| Passenger and Cargo Limited Quantity |      | Passenger and Cargo Limited Quantity |      |
| Packing Instructions:                | Y309 | Maximum Qty/Pack:                    | 1 L  |

Shipping Name: FLAMMABLE LIQUID, CORROSIVE, N.O.S. \*(CONTAINS ISOBUTYL ACETATE)

## Maritime Transport IMDG:

|                     |           |                     |         |
|---------------------|-----------|---------------------|---------|
| IMDG Class:         | 3         | IMDG Subrisk:       | 8       |
| UN Number:          | 2924      | Packing Group:      | III     |
| EMS Number:         | F-E , S-C | Special provisions: | 223 274 |
| Limited Quantities: | 5 L       |                     |         |

Shipping Name: FLAMMABLE LIQUID, CORROSIVE, N.O.S.(contains isobutyl acetate)

## Section 15 - REGULATORY INFORMATION

### POISONS SCHEDULE

None

### REGULATIONS

Regulations for ingredients

#### isobutyl acetate (CAS: 110-19-0) is found on the following regulatory lists;

"Australia Exposure Standards","Australia Hazardous Substances","Australia Inventory of Chemical Substances (AICS)","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals"

#### acetic acid glacial (CAS: 64-19-7) is found on the following regulatory lists;

"Australia Exposure Standards","Australia Hazardous Substances","Australia High Volume Industrial Chemical List (HVICL)","Australia Illicit Drug Reagents/Essential Chemicals - Category III","Australia Inventory of Chemical Substances (AICS)","Australia National Pollutant Inventory","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix F (Part 3)","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 2","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6",  
"CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless

continued...

Chemwatch Material Safety Data Sheet (REVIEW)

Issue Date: 16-Apr-2010

NC317TCP

CHEMWATCH 4642-78

Version No:4

CD 2010/2 Page 17 of 17

**Section 15 - REGULATORY INFORMATION**

Otherwise Specified, in Accordance with GMP", "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 Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

**No data for Solvent for Malic Acid by TLC (CW: 4642-78)****Section 16 - OTHER INFORMATION**

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

A list of reference resources used to assist the committee may be found at:

[www.chemwatch.net/references](http://www.chemwatch.net/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.

*This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.*

Issue Date: 16-Apr-2010

Print Date: 30-Jul-2010

*This is the end of the MSDS.*