



**RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427**

**Chemwatch Independent Material Safety Data Sheet**

**Issue Date: 4-Dec-2008**

**NA317TC**

**CHEMWATCH 18-3350**

**Version No:3**

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**Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**PRODUCT NAME**

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427

**PROPER SHIPPING NAME**

FLAMMABLE LIQUID, N.O.S.(contains naphtha petroleum, light, hydrotreated and isopropanol)

**PRODUCT USE**

■ The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing.

Before starting consider control of exposure by mechanical ventilation.  
Solvent-based activator for structural adhesive.

**SUPPLIER**

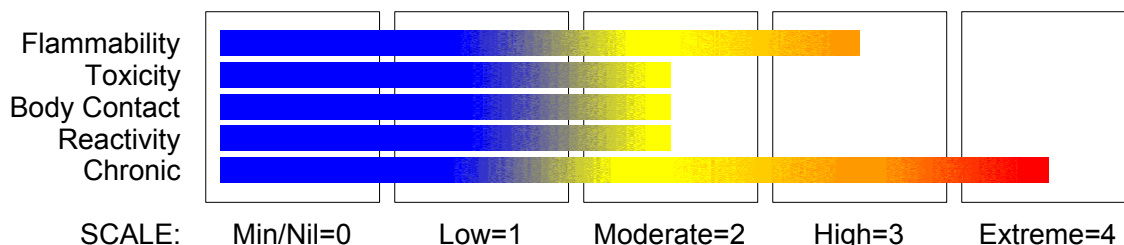
Company: RS Components	Company: RS Components
Address:	Address:
Units 30 & 31	25 Pavesi Street
Warehouse World	Smithfield
761 Great South Road	NSW2164
Penrose Auckland	AUS
	Telephone: 1300 656 636
	Emergency Tel: 1800 039 008
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	Fax: 1300 656 696

**Section 2 - HAZARDS IDENTIFICATION**

**STATEMENT OF HAZARDOUS NATURE**

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

**CHEMWATCH HAZARD RATINGS**



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### Section 2 - HAZARDS IDENTIFICATION



### POISONS SCHEDULE

S5

#### RISK

- Highly flammable.
  - Irritating to eyes and skin.
  
  - May cause CANCER.
  - May cause heritable genetic damage.
  
  - Harmful: danger of serious damage to health by prolonged exposure through inhalation in contact with skin and if swallowed.
  - Toxic to aquatic organisms may cause long-term adverse effects in the aquatic environment.
  - HARMFUL- May cause lung damage if swallowed.
  
  - Vapours may cause drowsiness and dizziness.
  
  - Inhalation skin contact and/or ingestion may produce health damage\*.
  - Cumulative effects may result following exposure\*.
  - May produce discomfort of the respiratory system\*.
  - Possible respiratory sensitiser\*.
  
  - May possibly affect fertility\*.
  
  - Repeated exposure potentially causes skin dryness and cracking\*.
- \* (limited evidence).

#### SAFETY

- Keep locked up.
- Keep away from sources of ignition. No smoking.
- Do not breathe gas/fumes/vapour/spray.
- In case of insufficient ventilation wear suitable respiratory equipment.
- Use only in well ventilated areas.
  
- Keep container in a well ventilated place.
  
- Avoid exposure - obtain special instructions before use.
- To clean the floor and all objects contaminated by this material use water and detergent.
- Keep container tightly closed.
  
- This material and its container must be disposed of in a safe way.
- Keep away from food drink and animal feeding stuffs.
- In case of contact with eyes rinse with plenty of water and contact Doctor or Poisons Information Centre.
- Use appropriate container to avoid environmental contamination.
- Avoid release to the environment. Refer to special instructions/Safety data sheets.
- This material and its container must be disposed of as hazardous waste.

### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
naphtha petroleum, light, hydrotreated	64742-49-0.	50-70
butyraldehyde/ aniline condensate	68411-20-1	10-30
isopropanol	67-63-0	1-10
copper naphthenate	1338-02-9	0-1

continued...

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**Section 4 - FIRST AID MEASURES**

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**SWALLOWED**

- 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.
- Seek medical advice.
- Avoid giving milk or oils.
- Avoid giving alcohol.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

**EYE**

- If this product comes in contact with the eyes:
  - Wash out immediately with fresh running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - If pain persists or recurs seek medical attention.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

**SKIN**

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

**INHALED**

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

**NOTES TO PHYSICIAN**

■ 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.

For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO<sub>2</sub> 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the

preferred agents, with aminophylline a second choice.

- Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology].

Treat symptomatically.

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## Section 5 - FIRE FIGHTING MEASURES

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### EXTINGUISHING MEDIA

- 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 breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control the 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 (CO<sub>2</sub>).

WARNING: In use may form flammable/ explosive vapour-air mixtures.

WARNING:

- Can become highly flammable in use.
- Avoid evaporation., nitrogen oxides (NO<sub>x</sub>), metal oxides, other pyrolysis products typical of burning organic material.

Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

WARNING: Long standing in contact with air and light may result in the formation of potentially explosive peroxides.

### FIRE INCOMPATIBILITY

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

### HAZCHEM: 3[Y]E

### Personal Protective Equipment

Gas tight chemical resistant suit.

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**Section 6 - ACCIDENTAL RELEASE MEASURES**


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**MINOR SPILLS**

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

**MAJOR SPILLS**

■ Chemical Class: aliphatic hydrocarbons

For release onto land: recommended sorbents listed in order of priority.

SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
<b>LAND SPILL - SMALL</b>				
cross- linked polymer - particulate	1	shovel	shovel	R, W, SS
cross- linked polymer - pillow	1	throw	pitchfork	R, DGC, RT
wood fiber - pillow	2	throw	pitchfork	R, P, DGC, RT
treated wood fibre-pillow	2	throw	pitchfork	DGC, RT
sorbent clay - particulate	3	shovel	shovel	R, I, P
foamed glass - pillow	3	throw	pitchfork	R, P, DGC, RT
<b>LAND SPILL - MEDIUM</b>				
cross- linked polymer - particulate	1	blower	skiploader	R, W, SS
cross- linked polymer - pillow	2	throw	skiploader	R, DGC, RT
sorbent clay - particulate	3	blower	skiploader	R, I, P
polypropylene - particulate	3	blower	skiploader	W, SS, DGC
expanded mineral - particulate	4	blower	skiploader	R, I, W, P, DGC
polypropylene - mat	4	throw	skiploader	DGC, RT

**Legend**

DGC: Not effective where ground cover is dense

R; Not reusable

I: Not incinerable

P: Effectiveness reduced when rainy

RT: Not effective where terrain is rugged

SS: Not for use within environmentally sensitive sites

W: Effectiveness reduced when windy

Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;

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

- Clear area of personnel and move upwind.

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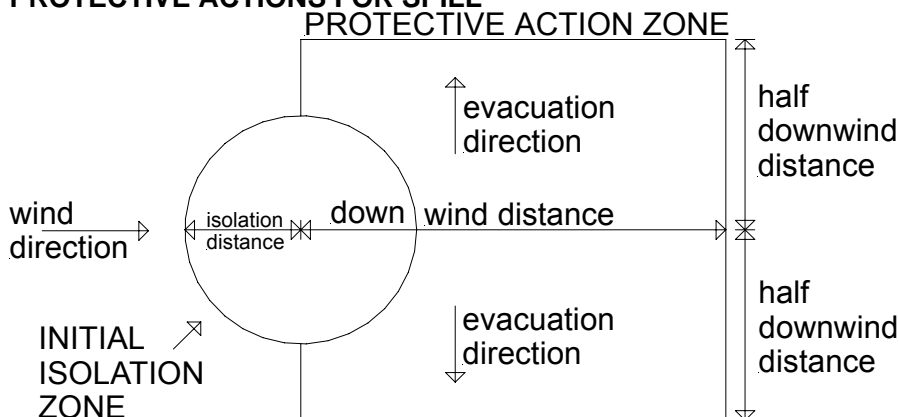
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### Section 6 - ACCIDENTAL RELEASE MEASURES

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse /absorb vapour.
- Contain spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

#### PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance	25 metres
Downwind Protection Distance	300 metres
IERG Number	14

#### 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 128 is taken from the US DOT emergency response guide book.
- 6 IERG information is derived from CANUTEC - Transport Canada.

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

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## Section 7 - HANDLING AND STORAGE

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### PROCEDURE FOR HANDLING

- Containers, even those that have been emptied, may contain explosive vapours.
  - Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- Contains low boiling substance:  
Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.
- Check for bulging containers.
  - Vent periodically
  - Always release caps or seals slowly to ensure slow dissipation of vapours.
  - DO NOT allow clothing wet with material to stay in contact with skin.
  - Electrostatic discharge may be generated during pumping - this may result in fire.
  - Ensure electrical continuity by bonding and grounding (earthing) all equipment.
  - Restrict line velocity during pumping in order to avoid generation of electrostatic discharge ( $\leq 1$  m/sec until fill pipe submerged to twice its diameter, then  $\leq 7$  m/sec).
  - Avoid splash filling.
  - Do NOT use compressed air for filling discharging or handling operations.
  - Avoid all personal contact, including inhalation.
  - Wear protective clothing when risk of exposure occurs.
  - Use in a well-ventilated area.
  - Prevent concentration in hollows and sumps.
  - DO NOT enter confined spaces until atmosphere has been checked.
  - Avoid smoking, naked lights, heat or ignition sources.
  - When handling, DO NOT eat, drink or smoke.
  - Vapour may ignite on pumping or pouring due to static electricity.
  - DO NOT use plastic buckets.
  - Earth and secure metal containers when dispensing or pouring product.
  - Use spark-free tools when handling.
  - Avoid contact with incompatible materials.
  - Keep containers securely sealed.
  - Avoid physical damage to containers.
  - Always wash hands with soap and water after handling.
  - Work clothes should be laundered separately.
  - Use good occupational work practice.
  - Observe manufacturer's storing and handling recommendations.
  - Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

### SUITABLE CONTAINER

- DO NOT use aluminium or galvanised containers.
  - Packing as supplied by manufacturer.
  - Plastic containers may only be used if approved for flammable liquid.
  - Check that containers are clearly labelled and free from leaks.
  - For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.
  - For materials with a viscosity of at least 2680 cSt. (23 deg. C)
  - For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)
  - Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C)
- (i) : Removable head packaging;  
(ii) : Cans with friction closures and  
(iii) : low pressure tubes and cartridges may be used.
- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages
  - In addition, where inner packagings are glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

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Section 7 - HANDLING AND STORAGE

#### STORAGE INCOMPATIBILITY

- Many arylamines (aromatic amines such as aniline, N-ethylaniline, o-toluidine, xylydine etc. and their mixtures) are hypergolic (ignite spontaneously) with red fuming nitric acid. When the amines are dissolved in triethylamine, ignition occurs at -60 deg. C. or less.
- Various metal oxides and their salts may promote ignition of amine-red fuming nitric acid systems. Soluble materials such as copper(I) oxide, ammonium metavanadate are effective; insoluble materials such as copper(II) oxide, iron(II) oxide, potassium dichromate are also effective.
- Avoid oxidising agents, acids, acid chlorides, acid anhydrides, chloroformates.

#### STORAGE REQUIREMENTS

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

#### SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

### 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>	Notes
Australia Exposure Standards	RS 2 Part Toughened Acrylic Adhesive Kit - Part B #473- 427 (Petrol (gasoline))		900			(see Chapter 16)
Australia Exposure Standards	naphtha petroleum, light, hydrotreated (Petrol (gasoline))		900			(see Chapter 16)
Australia Exposure Standards	isopropanol (Isopropyl alcohol)	400	983	500	1230	

The following materials had no OELs on our records

- butyraldehyde/ aniline condensate: CAS:68411- 20- 1

#### EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m <sup>3</sup> )	Revised IDLH Value (ppm)
isopropanol		2, 000 [LEL]

#### 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.

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### MATERIAL DATA

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427:

- Odour threshold: 0.25 ppm.

The TLV-TWA is protective against ocular and upper respiratory tract irritation and is recommended for bulk handling of gasoline based on calculations of hydrocarbon content of gasoline vapour. A STEL is recommended to prevent mucous membrane and ocular irritation and prevention of acute depression of the central nervous system. Because of the wide variation in molecular weights of its components, the conversion of ppm to mg/m<sup>3</sup> is approximate. Sweden recommends hexane type limits of 100 ppm and heptane and octane type limits of 300 ppm. Germany does not assign a value because of the widely differing compositions and resultant differences in toxic properties.

Odour Safety Factor (OSF)

OSF=0.042 (gasoline).

Odour Threshold Value: 3.3 ppm (detection), 7.6 ppm (recognition)

Exposure at or below the recommended isopropanol TLV-TWA and STEL is thought to minimise the potential for inducing narcotic effects or significant irritation of the eyes or upper respiratory tract. It is believed, in the absence of hard evidence, that this limit also provides protection against the development of chronic health effects. The limit is intermediate to that set for ethanol, which is less toxic, and n-propyl alcohol, which is more toxic, than isopropanol.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

- Odour Threshold Value: 34 ppm (detection), 97 ppm (recognition)

NOTE: Detector tubes for benzene, measuring in excess of 0.5 ppm, are commercially available. The relative quality of epidemiological data and quantitative health risk assessments related to documented and theoretical leukaemic deaths constitute the basis of the TLV-recommendation.

One study [Dow Chemical] demonstrates a significant fourfold increase in myelogenous leukaemia for workers exposed to average benzene concentrations of about 5 ppm for an average of 9 years and that 2 out of four individuals in the study who died from leukaemia were characterised as having been exposed to average benzene levels below 2 ppm. Based on such findings the estimated risk of leukaemia in workers exposed at daily benzene concentrations of 10 ppm for 40 years is 155 times that of unexposed workers; at 1 ppm the risk falls to 1.7 times whilst at 0.1 ppm the risk is about the same in the two groups. A revision of the TLV-TWA to 0.1 ppm was proposed in 1990 but this has been revised upwards as result of industry initiatives.

Typical toxicities displayed following inhalation:

- At 25 ppm (8 hours): no effect
- 50-150 ppm: signs of intoxication within 5 hours
- 500-1500 ppm: signs of intoxication within 1 hour
- 7500 ppm: severe intoxication within 30-60 minutes
- 20000 ppm: fatal within 5-10 minutes

Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. Some surveillance should emphasise (i) demography, occupational and medical history and health advice (ii) baseline blood sample for haematological profile (iii) records of personal exposure.

for heptane (all isomers)

The TLV-TWA is protective against narcotic and irritant effects which are greater than those of pentane or n-hexane but less than those of octane. The TLV-TWA applies to all isomers.

Inhalation by humans of 1000 ppm for 6 minutes produced slight dizziness. Higher concentrations for shorter periods produce marked vertigo, incoordination and hilarity. Signs of central nervous system depression occur in the absence of mucous membrane irritation. Brief exposures to high levels (5000 ppm for 4 minutes) produce nausea, loss of appetite and a "gasoline-like" taste in the mouth that persists for many hours after exposure ceases.

Odour threshold: 0.25 ppm.

The TLV-TWA is protective against ocular and upper respiratory tract irritation and is recommended for bulk handling of gasoline based on calculations of hydrocarbon content of gasoline vapour. A STEL is recommended to prevent mucous membrane and ocular irritation and prevention of acute depression of the central nervous system. Because of the wide variation in molecular weights of its components, the conversion of ppm to mg/m<sup>3</sup> is approximate. Sweden recommends hexane type limits of 100 ppm and heptane and octane type limits of 300 ppm. Germany does not assign a value because of the widely differing compositions and resultant differences in toxic properties.

Odour Safety Factor (OSF)

OSF=0.042 (gasoline).

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

for petroleum distillates:

CEL TWA: 500 ppm, 2000 mg/m<sup>3</sup> (compare OSHA TWA).

BUTYRALDEHYDE/ ANILINE CONDENSATE:

- No exposure limits set by NOHSC or ACGIH.

ISOPROPANOL:

- Odour Threshold Value: 3.3 ppm (detection), 7.6 ppm (recognition)

Exposure at or below the recommended isopropanol TLV-TWA and STEL is thought to minimise the potential for inducing narcotic effects or significant irritation of the eyes or upper respiratory tract. It is believed, in the absence of hard evidence, that this limit also provides protection against the development of chronic health effects. The limit is intermediate to that set for ethanol, which is less toxic, and n-propyl alcohol, which is more toxic, than isopropanol.

### PERSONAL PROTECTION



#### EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

#### HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
  - Wear safety footwear or safety gumboots, eg. Rubber.
- Suitability and durability of glove type is dependent on usage. Factors such as:
- frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
  - dexterity,
- are important in the selection of gloves.
- Neoprene rubber gloves.

#### OTHER

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

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### 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	AKNO- AUS P	-
1000	50	-	AKNO- AUS P
5000	50	Airline *	-
5000	100	-	AKNO- 2 P
10000	100	-	AKNO- 3 P
	100+		Airline**

\* - Continuous Flow

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

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

#### ENGINEERING CONTROLS

■ General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

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

continued...

## RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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.

Refer also to protective measures for the other component used with the product. Read both MSDS before using; store and attach MSDS together.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

#### APPEARANCE

Brown, highly flammable liquid with light paraffinic hydrocarbon odour; does not mix with water.

#### PHYSICAL PROPERTIES

Does not mix with water.

Floats on water.

Molecular Weight: Not Applicable

Specific Gravity (water=1): 0.79

pH (1% solution): Not Applicable

Evaporation Rate: Fast

Lower Explosive Limit (%): 1

Decomposition Temp (°C): Not Available

Boiling Range (°C): 80- 99

Solubility in water (g/L): Immiscible

Vapour Pressure (kPa): 5 @ 20 deg C

Relative Vapour Density (air=1): Not Available

Upper Explosive Limit (%): 7

State: LIQUID

Melting Range (°C): Not Available

pH (as supplied): Not Applicable

Volatile Component (%vol): Not Available

Flash Point (°C): - 4

Autoignition Temp (°C): 215

Viscosity: 10.6 cSt@ 20 deg °C

### Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

#### CONDITIONS CONTRIBUTING TO INSTABILITY

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

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

### Section 11 - TOXICOLOGICAL INFORMATION

#### POTENTIAL HEALTH EFFECTS

##### ACUTE HEALTH EFFECTS

##### SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result.

Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).

Rats given isoparaffinic hydrocarbons (after 18-24 hours fasting) showed lethargy and/or general weakness, ataxia and diarrhoea. Symptoms disappeared within 24-28 hours.

Ingestion of petroleum hydrocarbons may produce irritation of the pharynx, oesophagus, stomach and small

continued...

intestine with oedema and mucosal ulceration resulting; symptoms include a burning sensation in the mouth and throat. Large amounts may produce narcosis with nausea and vomiting, weakness or dizziness, slow and shallow respiration, swelling of the abdomen, unconsciousness and convulsions. Myocardial injury may produce arrhythmias, ventricular fibrillation and electrocardiographic changes. Central nervous system depression may also occur. Light aromatic hydrocarbons produce a warm, sharp, tingling sensation on contact with taste buds and may anaesthetise the tongue. Aspiration into the lungs may produce coughing, gagging and a chemical pneumonitis with pulmonary oedema and haemorrhage.

Following ingestion, a single exposure to isopropyl alcohol produced lethargy and non-specific effects such as weight loss and irritation. Ingestion of near-lethal doses of isopropanol produces histopathological changes of the stomach, lungs and kidneys, incoordination, lethargy, gastrointestinal tract irritation, and inactivity or anaesthesia.

Swallowing 10 ml. of isopropanol may cause serious injury; 100 ml. may be fatal if not promptly treated. The adult single lethal doses is approximately 250 ml. The toxicity of isopropanol is twice that of ethanol and the symptoms of intoxication appear to be similar except for the absence of an initial euphoric effect; gastritis and vomiting are more prominent. Ingestion may cause nausea, vomiting, and diarrhoea. There is evidence that a slight tolerance to isopropanol may be acquired.

## **EYE**

■ Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

Petroleum hydrocarbons may produce pain after direct contact with the eyes. Slight, but transient disturbances of the corneal epithelium may also result. The aromatic fraction may produce irritation and lachrymation.

Isopropanol vapour may cause mild eye irritation at 400 ppm. Splashes may cause severe eye irritation, possible corneal burns and eye damage. Eye contact may cause tearing or blurring of vision.

## **SKIN**

■ Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. The material may accentuate any pre-existing dermatitis condition.

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

Open cuts, abraded or irritated skin should not be exposed to this material.

Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds 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.

The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives .

Aromatic hydrocarbons may produce skin irritation, vasodilation with erythema and changes in endothelial cell permeability. Systemic intoxication, resulting from contact with the light aromatics, is unlikely due to the slow rate of permeation. Branching of the side chain appears to increase percutaneous absorption.

## **INHALED**

■ Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.

Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the

damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.

Inhalation hazard is increased at higher temperatures.

High inhaled concentrations of mixed hydrocarbons may produce narcosis characterised by nausea, vomiting and lightheadedness. Inhalation of aerosols may produce severe pulmonary oedema, pneumonitis and pulmonary haemorrhage. Inhalation of petroleum hydrocarbons consisting substantially of low molecular weight species (typically C2-C12) may produce irritation of mucous membranes, incoordination, giddiness, nausea, vertigo, confusion, headache, appetite loss, drowsiness, tremors and anaesthetic stupor. Massive exposures may produce central nervous system depression with sudden collapse and deep coma; fatalities have been recorded.

Irritation of the brain and/or apnoeic anoxia may produce convulsions. Although recovery following overexposure is generally complete, cerebral micro-haemorrhage of focal post-inflammatory scarring may produce epileptiform seizures some months after the exposure. Pulmonary episodes may include chemical pneumonitis with oedema and haemorrhage. The lighter hydrocarbons may produce kidney and neurotoxic effects. Pulmonary irritancy increases with carbon chain length for paraffins and olefins. Alkenes produce pulmonary oedema at high concentrations. Liquid paraffins may produce anaesthesia and depressant actions leading to weakness, dizziness, slow and shallow respiration, unconsciousness, convulsions and death. C5-7 paraffins may also produce polyneuropathy. Aromatic hydrocarbons accumulate in lipid rich tissues (typically the brain, spinal cord and peripheral nerves) and may produce functional impairment manifested by nonspecific symptoms such as nausea, weakness, fatigue and vertigo; severe exposures may produce inebriation or unconsciousness.

Many of the petroleum hydrocarbons are cardiac sensitisers and may cause ventricular fibrillations.

Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.

Some aliphatic hydrocarbons produce axonal neuropathies. Isoparaffinic hydrocarbons produce injury to the kidneys of male rats. When albino rats were exposed to isoparaffins at 21.4 mg/l for 4 hours, all animals experienced weakness, tremors, salivation, mild to moderate convulsions, chromodacryorrhoea and ataxia within the first 24 hours. Symptoms disappeared after 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. Vapour is heavier than air and may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

Acute effects from inhalation of high concentrations of vapour are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterised by headache and dizziness, increased reaction time, fatigue and loss of co-ordination.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose. The effects in animals subject to a single exposure, by inhalation, included inactivity or anaesthesia and histopathological changes in the nasal canal and auditory canal.

Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

### CHRONIC HEALTH EFFECTS

■ Exposure to the material may cause concerns for human fertility, generally on the basis that results in animal studies provide sufficient evidence to cause a strong suspicion of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.

On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Limited evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a significant number of individuals at a greater frequency than would be expected from the response of a normal population.

Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases. Symptoms can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes and passive smoking.

Repeated or prolonged exposure to mixed hydrocarbons may produce narcosis with dizziness, weakness, irritability, concentration and/or memory loss, tremor in the fingers and tongue, vertigo, olfactory disorders, constriction of visual field, paraesthesias of the extremities, weight loss and anaemia and degenerative changes in the liver and kidney. Chronic exposure by petroleum workers, to the lighter hydrocarbons, has been associated with visual disturbances, damage to the central nervous system, peripheral neuropathies (including numbness and paraesthesias), psychological and neurophysiological deficits, bone marrow toxicities (including hypoplasia possibly due to benzene) and hepatic and renal involvement. Chronic dermal exposure to petroleum hydrocarbons may result in defatting which produces localised dermatoses. Surface cracking and erosion may also increase susceptibility to infection by microorganisms. One epidemiological study of petroleum refinery workers has reported elevations in standard mortality ratios for skin cancer along with a dose-response relationship indicating an association between routine workplace exposure to petroleum or one of its constituents and skin cancer, particularly melanoma. Other studies have been unable to confirm this finding.

Repeated application of mildly hydrotreated oils (principally paraffinic), to mouse skin, induced skin tumours; no tumours were induced with severely hydrotreated oils.

Long term or repeated ingestion exposure of isopropanol may produce incoordination, lethargy and reduced weight gain.

Repeated inhalation exposure to isopropanol may produce narcosis, incoordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in the adult animals. Isopropanol does not cause genetic damage in bacterial or mammalian cell cultures or in animals.

There are inconclusive reports of human sensitisation from skin contact with isopropanol. Chronic alcoholics are more tolerant of systemic isopropanol than are persons who do not consume alcohol; alcoholics have survived as much as 500 ml. of 70% isopropanol.

Continued voluntary drinking of a 2.5% aqueous solution through two successive generations of rats produced no reproductive effects.

NOTE: Commercial isopropanol does not contain "isopropyl oil". An excess incidence of sinus and laryngeal cancers in isopropanol production workers has been shown to be caused by the byproduct "isopropyl oil". Changes in the production processes now ensure that no byproduct is formed. Production changes include use of dilute sulfuric acid at higher temperatures.

Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS].

## TOXICITY AND IRRITATION

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

■ Lifetime exposure of rodents to gasoline produces carcinogenicity although the relevance to humans has been questioned. Gasoline induces kidney cancer in male rats as a consequence of accumulation of the alpha2-microglobulin protein in hyaline droplets in the male (but not female) rat kidney. Such abnormal accumulation represents lysosomal overload and leads to chronic renal tubular cell degeneration, accumulation of cell debris, mineralisation of renal medullary tubules and necrosis. A sustained regenerative proliferation occurs in epithelial cells with subsequent neoplastic transformation with continued exposure. The alpha2-microglobulin is produced under the influence of hormonal controls in male rats but not in females and, more importantly, not in humans.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

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

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The High Benzene Naphthas (HBNs) Category was developed for the HPV Program by grouping ethylene

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### Section 11 - TOXICOLOGICAL INFORMATION

manufacturing streams (products) that exhibit commonalities from both manufacturing process and compositional perspectives. intermediates. The category includes hydrocarbon product streams associated with the ethylene industry that contain significant levels of benzene, generally with a benzene content greater than 10% and averaging about 55%. This grouping of CAS numbers represents hydrocarbon streams with a carbon number distribution that is predominantly C5- C11, through components boiling at 350 C or higher..

Benzene, as the predominant component in most streams, is expected to be the key driver with respect to health effects endpoints within the SIDS battery of tests. However, as the concentration of benzene is decreased and the concentrations of other components are increased, the observed effects of benzene are expected to diminish and the effects of other components are expected to increase.

The existing epidemiology and toxicology database for the components other than benzene and for mixtures containing the components is extensive. All components present in the streams at concentrations greater than 5% have been tested in at least one toxicity study. Those components having only limited data lack structural alerts for mammalian toxicity and data exist for their structural analogs. The C5 and C6 alkanes and alkenes present in the streams are not expected to significantly contribute to the toxicity profile as these substances are present in the streams at low concentrations

and, with the exception of hexane, generally have a low level of toxicity. The toxic effects of hexane (present at < 15%) are unlikely to be observed due to the presence of the other components.

**Genotoxicity:** When tested as pure substances, some of the components other than benzene have caused genetic damage and adverse target organ effects in repeated-dose animal studies. When tested as pure substances, some of the components other than benzene have caused genetic damage and adverse target organ effects in repeated-dose animal studies. However, since the biologically active components of the High Benzene Naphthas streams are metabolized through a common P450 metabolic pathway, it is anticipated that multiple components will compete for the same active enzyme sites. Component toxicities, which are dependent on the formation of biologically active metabolites, may be reduced as less metabolite(s) will be produced through competition for these sites. Direct support for reduction or elimination of toxicities of individual components is provided by results of an existing mouse bone marrow micronucleus test with one of the High Benzene Naphthas streams, Hydrotreated C6-8 Fraction. This stream, containing approximately 55% benzene, was negative in a mouse bone marrow micronucleus test when administered by oral gavage at 5000 mg/kg to male and female CD-1 mice. Several studies have shown that benzene administered orally to CD-1 mice induces high frequencies of micronuclei in bone marrow erythrocytes at doses as low as 110 mg/kg . The presence in the Hydrotreated C6-8 Fraction of other components (approximately 25% toluene, 10% xylene, 7% pentane, 7% ethylbenzene, 3% cyclohexane, and 2% hexane) apparently inhibited the expected clastogenicity of benzene. Other similar interactions between components of the category have also been reported.

**Repeat dose toxicity:** Repeated oral or inhalation exposures to many of the components of the streams in the category have been shown to cause adverse health effects in a variety of organs. However, existing data also show that antagonistic and synergistic interactions occur between some components comprising the streams.

**Developmental toxicity:** Developmental toxicity data exist for most components present in this category at concentrations greater than 5% . In these studies, no convincing evidence was seen for teratogenicity in the absence of maternal toxicity. Foetotoxicity has been reported for some components, but mostly in the presence of maternal toxicity. A Pyrolysis

Gasoline Fraction stream similar to the Pyrolysis Gasoline streams in the HBNs Category has been tested in an oral developmental toxicity study in rabbits. No developmental effects were seen.

**Reproductive toxicity:** Some data for benzene indicates adverse gonadal effects (e.g., atrophy/degeneration, decrease in spermatozoa, moderate increases in abnormal sperm forms), data on reproductive outcomes are either inconclusive or conflicting. However, most studies indicate no effects on reproductive indices, even at high doses. Reproductive organ effects were seen after inhalation exposure to isoprene and hexane.

**Gene Mutation:** Of the identified category components present at concentrations greater than 5%, only 1,3-butadiene

and benzene have consistently caused gene mutations in genetic toxicity tests . 1,3- Butadiene was positive in several in vivo and in vitro tests. Benzene was negative in several standard tests but was positive in an in vivo HPRT gene mutation test in mouse spleenocytes. Based on the data for components, the streams in the category are predicted to be negative in the HPV gene mutation test (Ames Test). Negative Ames Tests conducted with two streams (one from this category and one similar to category streams) support this prediction

**Chromosome Aberration::** Benzene has caused chromosome aberrations in in vitro and in vivo tests. The other most prevalent component in streams in this category, toluene, is negative in both in vitro and in vivo tests. Of the remaining identified category components present at concentrations greater than 5%, only vinyl acetate, 1,3-butadiene, isoprene, hexane, and naphthalene have been reported to cause chromosome aberrations. No significant acute toxicological data identified in literature search.

continued...



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#### BUTYRALDEHYDE/ ANILINE CONDENSATE:

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

#### TOXICITY

Oral (rat) LD50: 2250 mg/kg \*

Oral (rat) LD50: 1000 mg/kg \*\*

\* Vanderbilt

\*\* Bostik

#### IRRITATION

Nil Reported

#### ISOPROPANOL:

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

#### TOXICITY

Oral (human) LDLo: 3570 mg/kg

Oral (human) TDLo: 223 mg/kg

Oral (man) TDLo: 14432 mg/kg

Oral (rat) LD50: 5045 mg/kg

Dermal (rabbit) LD50: 12800 mg/kg

■ For isopropanol (IPA):

Acute toxicity: Isopropanol has a low order of acute toxicity. It is irritating to the eyes, but not to the skin. Very high vapor concentrations are irritating to the eyes, nose, and throat, and prolonged exposure may produce central nervous system depression and narcosis. Human volunteers reported that exposure to 400 ppm isopropanol vapors for 3 to 5 min. caused mild irritation of the eyes, nose and throat.

Although isopropanol produced little irritation when tested on the skin of human volunteers, there have been reports of isolated cases of dermal irritation and/or sensitization. The use of isopropanol as a sponge treatment for the control of fever has resulted in cases of intoxication, probably the result of both dermal absorption and inhalation. There have been a number of cases of poisoning reported due to the intentional ingestion of isopropanol, particularly among alcoholics or suicide victims. These ingestions typically result in a comatose condition. Pulmonary difficulty, nausea, vomiting, and headache accompanied by various degrees of central nervous system depression are typical. In the absence of shock, recovery usually occurred.

Repeat dose studies: The systemic (non-cancer) toxicity of repeated exposure to isopropanol has been evaluated in rats and mice by the inhalation and oral routes. The only adverse effects-in addition to clinical signs identified

from these studies were to the kidney.

Reproductive toxicity: A recent two-generation reproductive study characterised the reproductive hazard for isopropanol associated with oral gavage exposure. This study found that the only reproductive parameter apparently affected by isopropanol exposure was a statistically significant decrease in male mating index of the F1 males. It is possible that the change in this reproductive parameter was treatment related and significant, although the mechanism of this effect could not be discerned from the results of the study.

However, the lack of a significant effect of the female mating index in either generation, the absence of any adverse effect on litter size, and the lack of histopathological findings of the testes of the high-dose males suggest that the observed reduction in male mating index may not be biologically meaningful.

Developmental toxicity: The developmental toxicity of isopropanol has been characterized in rat and rabbit developmental toxicity studies. These studies indicate that isopropanol is not a selective developmental hazard. Isopropanol produced developmental toxicity in rats, but not in rabbits. In the rat, the developmental toxicity occurred only at maternally toxic doses and consisted of decreased foetal body weights, but no teratogenicity

Genotoxicity: All genotoxicity assays reported for isopropanol have been negative

Carcinogenicity: rodent inhalation studies were conducted to evaluate isopropanol for cancer potential. The only tumor rate increase seen was for interstitial (Leydig) cell tumors in the male rats. Interstitial cell tumors of the testis is typically the most frequently observed spontaneous tumor in aged male Fischer 344 rats. These studies demonstrate that isopropanol does not exhibit carcinogenic potential relevant to humans. Furthermore, there was no evidence from this study to indicate the development of carcinomas of the testes in the male rat, nor has isopropanol been found to be genotoxic. Thus, the testicular tumors seen in the isopropanol exposed male rats are considered of no significance in terms of human cancer risk assessment.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and

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intracellular oedema of the epidermis.

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

#### COPPER NAPHTHENATE:

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

#### TOXICITY

Oral (rat) LD50: 2000 mg/kg

#### IRRITATION

Nil Reported

#### CARCINOGEN

Gasoline (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2B
Petroleum solvents	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
Isopropanol	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3

### Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

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COPPER NAPHTHENATE:

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

■ 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.

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427:

COPPER NAPHTHENATE:

ISOPROPANOL:

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

■ DO NOT discharge into sewer or waterways.

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427:

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

■ Toxic to aquatic organisms.

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427:

Marine Pollutant: Not Determined

/53#90arylamine#90alk#90hc

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

continued...

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■ May cause long-term adverse effects in the aquatic environment.

■ For High Benzene Naphthas (HBNs) category:

Environmental fate:

The chemical components in HBNs are relatively volatile, and if released they would be expected to partition to the air phase to a significant extent. In the air, they are subject to rapid physical degradation through hydroxyl radical attack. Therefore, as a result of both biological and physical degradation processes, these products are not expected to persist in the environment

Read across biodegradation data show that products in the HBNs have the potential to exhibit a high extent of biodegradability. The carbon number of products in this category ranges primarily between C5 to C11. Results for several chemicals, including benzene, with carbon numbers in this range that are contained by these products have been shown to biodegrade from 63 to 100% after 14 or 28 days, while results for several comparable, complex products containing several components range from 21 to 96% after 28 days.

Hydrocarbons are not expected to hydrolyse at a measurable rate.

Ecotoxicity:

Read across aquatic toxicity data show that HBNs have the potential to produce a moderate level of toxicity in freshwater algae and acute toxicity in freshwater fish and invertebrates. The aquatic toxicity data within a narrow range of values regardless of their varying chemical class content and carbon number range. This is not unexpected, because the constituent chemicals of products in this category are neutral organic hydrocarbons whose toxic mode of action is non-polar narcosis. The mechanism of short-term toxicity for these chemicals is disruption of biological membrane function. The existing fish toxicity database for narcotic chemicals supports a critical body residue (CBR, the internal concentration that causes mortality) of between approximately 2-8 mmol/kg fish (wet weight), supporting the assessment that these chemicals have equal potencies. When normalized to lipid content, the CBR is approximately 50 umol of hydrocarbon/g of lipid for most organisms. Because the products in this category are all complex mixtures containing relatively similar series of homologous chemicals, their short-term toxicities are expected to fall within the range of toxicity demonstrated by the individual chemicals.

The fish and invertebrate acute and alga toxicity values for individual chemicals and complex products similar to those in this category fall within a range of approximately 1-64 mg/L and overlap between the three trophic levels. Because HBNs will range in paraffin, alkene, and/or aromatic carbon number content within approximately C5 to C11, a range in toxicity for products in this category is expected. Experimental data, this category will exhibit a moderate range of acute toxicity to fish and invertebrates and a moderate range of toxicity to algae. For representative chemicals and products, experimental acute fish toxicity values range between 2.5 to 46 mg/L for two species while acute invertebrate toxicity values range between 0.9 to 32 mg/L for one species. In comparison, alga toxicity values for one species range between 1.0 to 64 mg/L (for biomass and growth rate endpoints), while alga NOELR values range between 1.0 to 51 mg/L (for biomass or growth rate endpoints).

■ For benzene:

log Kow: 1.95-2.15

log Koc: 1.7-2

Koc: 85

log Kom: 1.04-2.56

Half-life (hr) air: 2.4-501

Half-life (hr) H2O surface water: 4.81-384

Half-life (hr) H2O ground: 240-17280

Half-life (hr) soil: 48-922

Henry's Pa m<sup>3</sup> /mol: 441-595

Henry's atm m<sup>3</sup> /mol: 5.43E-03

BOD 5 if unstated: 2.18

COD: 0.25-2.8

ThOD: 3.1

BCF: 3.5-3.9

Log BCF: 0.54-1.48

Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.); benzene: 10 ug/l (WHO guideline)

Soil Guidelines: Dutch Criteria: 0.05 mg/kg (detection limit) target; 1 mg/kg (intervention)

Air Quality Standards: 1 ppb averaging time 1 year (UK)

No safe level recommended due to carcinogenic properties (WHO Guideline)

If benzene is released to the atmosphere it remains predominantly in the vapour phase.

Vapour phase benzene is not subject to direct photolysis but reacts with photochemically produced hydroxyl radicals (half-life approximately 13.4 days). Reaction time in polluted atmospheres which contain nitrogen

continued...

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oxide (NO) or sulfur dioxide (SO<sub>2</sub>) is accelerated (half-life 4-6 hours); products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrates.

In water, benzene is rapidly volatilised (half-life 2.7 hours).

In soil benzene undergoes rapid volatilisation; it is not absorbed, to any appreciable degree, by sediments.

Benzene does not bioaccumulate in the food chain.

**Environmental Fate**

**Terrestrial fate:** A Koc value of 85, indicates that benzene is expected to have high mobility in soil.

Volatilisation of benzene from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of  $5.43 \times 10^{-3}$  atm-cu m/mole. The potential for volatilisation of benzene from dry soil surfaces may exist based upon a vapor pressure of 94.8 mm Hg. Benzene is expected to biodegrade in soils based on a biodegradation study in a base-rich para-brownish soil where 20 ppm benzene was 24% degraded in 1 week, 44% in 5 weeks, and 47% in 10 weeks. Anaerobic degradation of benzene in soil is not expected to be an important loss process based on various studies. In one study of chemical biotransformation under nitrate- and sulfate-reducing conditions, benzene was found to be stable for 60 days. In a related study, benzene did not undergo biodegradation in situ nor in laboratory controlled soil samples under denitrifying conditions.

**Aquatic fate:** The Koc value of 85, indicates that benzene is not expected to adsorb to sediment and suspended solids in water. Volatilisation from water surfaces is expected based upon the Henry's Law constant. Using this Henry's Law constant, volatilisation half-lives for a model river and model lake are estimated to be 1 hr and 3.5 days, respectively. Anaerobic degradation of benzene in water is not expected to be an important loss process based on various studies. In one study of chemical biotransformation under nitrate- and sulfate-reducing conditions, benzene was found to be stable for 60 days. In aqueous solution, benzene will react with hydroxyl radical at a reaction rate of  $7.8 \times 10^9$  L/mol sec; using the average OH radical concentration ( $1.0 \times 10^{-17}$  molec/cu cm), benzene would have a half-life of 103 days. A BCF ranging from 1.1-20 suggests the potential for bioconcentration in aquatic organisms is low.

**Aquatic fate:** Evaporation was the primary loss mechanism in winter in a mesocosm experiment which simulated a northern bay where the half-life was 13 days. In spring and summer the half-lives were 23 and 3.1 days, respectively. In these cases biodegradation plays a major role and takes about 2 days. However, acclimation is critical and this takes much longer in the colder water in spring. According to one experiment, benzene has a half-life of 17 days due to photodegradation which could contribute to benzene's removal. In situations of cold water, poor nutrients, or other conditions less conducive to microbial growth, photolysis will play an important role in degradation. The half-life of benzene in sea water is about 5 hrs based on its high Henry's Law constant of  $5.56 \times 10^{-3}$  atm-cu m/mole.

**Atmospheric fate:** According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere benzene, which has a vapour pressure of 94.8 mm Hg at 25 deg C, is expected to exist solely as a vapor in the ambient atmosphere. Vapour-phase benzene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 13 days, calculated from its rate constant of  $1.23 \times 10^{-12}$  cu cm/molecule-sec at 25 deg C. The half-life in polluted atmospheres which contain nitrogen oxides or sulfur dioxide has been observed to shorten to 4-6 hrs. Vapour-phase benzene is also degraded in the atmosphere by atmospheric ozone radicals at an extremely slow rate; the half-life for this reaction in air is estimated to be 170,000 days. The reaction rate of benzene with nitrate radical in the atmosphere is estimated to be less than  $0.3 \times 10^{-16}$  cu cm/molecule sec at 25 deg C; the half-life for this reaction in air is estimated to be greater than or equal to 111 days based on an average concentration of nitrate radicals of  $2.4 \times 10^8$  molec/cu cm. Benzene has a maximum absorbance frequency of 253 nm suggesting that direct photolysis will not be an important degradation process. Due to benzene's high water solubility, it may be removed from the atmosphere by rainfall

**Ecotoxicity:**

Fish LC50 (96 h): bass (*Morone saxatilis*) 5.8-11 mg/l

Fish LC50 (24-96 h) fathead minnow (*Pimephales promelus*) 33-35 mg/l (softwater); 24-32 mg/l (hardwater);

bluegill sunfish (*Lepomis macrochirus*) 22 mg/l; goldfish (*Carassius auratus*) 36 mg/l (softwater); mosquito fish (*Gambusia affinis*) 395 mg/l

Fish LC50 (24-48 h): bluegill sunfish (*Lepomis macrochirus*) 20 mg/l

Fish LC50 (24 h): goldfish (*Carassius auratus*) 46 mg/l; blue gill sunfish (*Lepomis macrochirus*) 34 mg/l

Fish LC100 (2 h): blue gill sunfish (*Lepomis macrochirus*) 60 mg/l

Fish LC50 (14 d): guppy (*Poecilia reticulata*) 63 mg/l

Fish LC50 (1 h): brown trout yearlings (*Salmo trutta*) 12 mg/l (static assay)

Ciliate LC100 (24 h): *Tetrahymena pyriformis* 12.8 mmole/l

Grass shrimp (*Palaemonetes pugio*) LC50 (96 h): 27 ppm

Shrimp (*Crangon francorum*) LC50 (96 h): 20 mg/l

Crab larvae (*Cancer magister*) LC50 (96 h): 108 ppm

continued...

**RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART B #473-427**

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Mexican axolotl (*Ambystoma mexicanum*) LC50 (48 h): 370 mg/l (3-4 weeks after hatching)

Clawed toad LC50 (48 h): 190 mg/l (3-4 weeks after hatching).

■ For n-heptane:

log Kow : 4.66

Koc : 2400-8100

Half-life (hr) air : 52.8

Half-life (hr) H2O surface water : 2.9-312

Henry's atm m3 /mol: 2.06

BOD 5 if unstated: 1.92

COD : 0.06

BCF : 340-2000

log BCF : 2.53-3.31

Environmental fate:

Photolysis or hydrolysis of n-heptane are not expected to be important environmental fate processes.

Biodegradation of n-heptane may occur in soil and water, however volatilisation and adsorption are expected to be more important fate processes. A high Koc (2400-8200) indicates n-heptane will be slightly mobile to immobile in soil. In aquatic systems n-heptane may partition from the water column to organic matter in sediments and suspended solids. The bioconcentration of n-heptane may be important in aquatic environments. The Henry's Law constant suggests rapid volatilisation from environmental waters and surface soils. The volatilisation half-lives from a model river and a model pond (the latter considers the effect of adsorption) have been estimated to be 2.9 hr and 13 days, respectively.

n-Heptane is expected to exist entirely in the vapour phase in ambient air. Reactions with photochemically produced hydroxyl radicals in the atmosphere have been shown to be important (estimated half-life of 2.4 days calculated from its rate constant of  $7.15 \times 10^{-12}$  cu cm/molecule-sec at 25 deg C). Data also suggests that night-time reactions with nitrate radicals may contribute to the atmospheric transformation of n-heptane, especially in urban environments. n-Heptane does not contain chromophores that absorb at wavelengths >290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight

An estimated BCF of 2,000 using log Kow suggests the potential for bioconcentration in aquatic organisms is very high. Based on 100% degradation after 4 days in water inoculated with gasoline contaminated soil and 100% degradation after 25 days in water inoculated with activated sewage sludge, biodegradation is expected to be an important fate process for n-heptane in water.

Ecotoxicity:

Fish LC50 (48 h): goldfish (*Carrasius auratus*) 4 mg/l; golden orfe (*Idus melanotus*) 2940 mg/l; western mosquitofish (*Gambusia affinis*) 4924 mg/l

Daphnia LC50 (24 h): >10 mg/l

Daphnia EC50 (96 h): 82 mg/l (immobilisation)

Opposum shrimp (*Mysidopsis bahia*) LC50 (96 h): 0.1 mg/l

Snail EC50 (96 h): 472 mg/l.

ISOPROPANOL:

■ log Kow (Sangster 1997):	0.05
■ log Pow (Verschueren 1983):	- 0.5714285
■ BOD5:	60%
■ BOD20:	78%
■ COD:	2.23
■ ThOD:	2.4
■ Half- life Soil - High (hours):	168
■ Half- life Soil - Low (hours):	24
■ Half- life Air - High (hours):	72
■ Half- life Air - Low (hours):	6.2
■ Half- life Surface water - High (hours):	168
■ Half- life Surface water - Low (hours):	24
■ Half- life Ground water - High (hours):	336
■ Half- life Ground water - Low (hours):	48
■ Aqueous biodegradation - Aerobic - High (hours):	168
■ Aqueous biodegradation - Aerobic - Low (hours):	24
■ Aqueous biodegradation - Anaerobic - High (hours):	672
■ Aqueous biodegradation - Anaerobic - Low (hours):	96
■ Photooxidation half- life water - High (hours):	1.90E+05

continued...

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■ Photooxidation half- life water - Low (hours):	4728
■ Photooxidation half- life air - High (hours):	72
■ Photooxidation half- life air - Low (hours):	6.2

## ■ For isopropanol (IPA):

log Kow : -0.16- 0.28

Half-life (hr) air : 33-84

Half-life (hr) H2O surface water : 130

Henry's atm m3 /mol: 8.07E-06

BOD 5: 1.19,60%

COD : 1.61-2.30,97%

ThOD : 2.4

BOD 20: &gt;70% \* [Akzo Nobel]

## Environmental Fate

Based on calculated results from a lever 1 fugacity model, IPA is expected to partition primarily to the aquatic compartment (77.7%) with the remainder to the air (22.3%). IPA has been shown to biodegrade rapidly in aerobic, aqueous biodegradation tests and therefore, would not be expected to persist in aquatic habitats. IPA is also not expected to persist in surface soils due to rapid evaporation to the air. In the air,

physical degradation will occur rapidly due to hydroxy

radical (OH) attack. Overall, IPA presents a low potential hazard to aquatic or terrestrial biota.

IPA is expected to volatilise slowly from water based on a calculated Henry's Law constant of  $7.52 \times 10^{-6}$

atm.m<sup>3</sup> /mole. The calculated half-life for the volatilisation from surface water (1 meter depth) is

predicted to range from 4 days (from a river) to 31 days (from a lake). Hydrolysis is not considered a

significant degradation process for IPA. However, aerobic biodegradation of IPA has been shown to occur

rapidly under non-acclimated conditions, based on a result of 49% biodegradation from a 5 day BOD test.

Additional biodegradation data developed using standardized test methods show that IPA is readily

biodegradable in both freshwater and saltwater media (72 to 78% biodegradation in 20 days).

IPA will evaporate quickly from soil due to its high vapor pressure (43 hPa at 20°C), and is not expected to

partition to the soil based on a calculated soil adsorption coefficient (log Koc) of 0.03.

IPA has the potential to leach through the soil due to its low soil adsorption

In the air, isopropanol is subject to oxidation predominantly by hydroxy radical attack. The room temperature

rate constants determined by several investigators are in good agreement for the reaction of IPA with hydroxy

radicals. The atmospheric half-life is expected to be 10 to 25 hours, based on measured degradation rates

ranging from  $5.1$  to  $7.1 \times 10^{-12}$  cm<sup>3</sup> /molecule-sec, and an OH concentration of  $1.5 \times 10^6$  molecule/cm<sup>3</sup>, which

is a commonly used default value for calculating atmospheric half-lives. Using OH concentrations

representative of polluted ( $3 \times 10^6$ ) and pristine ( $3 \times 10^5$ ) air, the atmospheric half-life of IPA would

range from 9 to 126 hours, respectively. Direct photolysis is not expected to be an important transformation

process for the degradation of IPA.

## Ecotoxicity:

IPA has been shown to have a low order of acute aquatic toxicity. Results from 24- to 96-hour LC50 studies

range from 1,400 to more than 10,000 mg/L for freshwater and saltwater fish and invertebrates. In addition,

16-hour to 8-day toxicity threshold levels (equivalent to 3% inhibition in cell growth) ranging from 104 to 4,

930 mg/L have been demonstrated for various microorganisms.

Chronic aquatic toxicity has also been shown to be of low concern, based on 16- to 21-day NOEC values of 141

to 30 mg/L, respectively, for a freshwater invertebrate. Bioconcentration of IPA in aquatic organisms is not

expected to occur based on a measured log octanol/water partition coefficient (log Kow) of 0.05, a calculated

bioconcentration factor of 1 for a freshwater fish, and the unlikelihood of constant, long-term exposures.

## Toxicity to Plants

Toxicity of IPA to plants is expected to be low, based on a 7-day toxicity threshold value of 1,800 mg/L for

a freshwater algae, and an EC50 value of 2,100 mg/L from a lettuce seed germination test.

## COPPER NAPHTHENATE:

■ Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

■ Copper is unlikely to accumulate in the atmosphere due to a short residence time for airborne copper aerosols. Airborne coppers, however, may be transported over large distances. Copper accumulates significantly in the food chain.

## Drinking Water Standards:

3000 ug/l (UK max)

2000 ug/l (WHO provisional Guideline)

continued...

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1000 ug/l (WHO level where individuals complain)

Soil Guidelines: Dutch Criteria

36 mg/kg (target)

190 mg/kg (intervention)

Air Quality Standards: no data available.

The toxic effect of copper in the aquatic biota depends on the bio-availability of copper in water which, in turn, depends on its physico-chemical form (ie.speciation). Bioavailability is decreased by complexation and adsorption of copper by natural organic matter, iron and manganese hydrated oxides, and chelating agents excreted by algae and other aquatic organisms. Toxicity is also affected by pH and hardness. Total copper is rarely useful as a predictor of toxicity. In natural sea water, more than 98% of copper is organically bound and in river waters a high percentage is often organically bound, but the actual percentage depends on the river water and its pH.

Copper exhibits significant toxicity in some aquatic organisms. Some algal species are very sensitive to copper with EC50 (96 hour) values as low as 47 ug/litre dissolved copper whilst for other algal species EC50 values of up to 481 ug/litre have been reported. However many of the reportedly high EC50 values may arise in experiments conducted with a culture media containing copper-complexing agents such as silicate, iron, manganese and EDTA which reduce bioavailability.

■ Toxic effects arising following exposure by aquatic species to copper are typically:

Algae EC50 (96 h)	Daphnia magna LC50 (48- 96 h)	Amphipods LC50 (48- 96 h)	Gastropods LC50 (48- 96 h)	Crab larvae LC50 (48- 96 h)
47- 481 *	7- 54 *	37- 183 *	58- 112 *	50- 100 *

\* ug/litre

Exposure to concentrations ranging from one to a few hundred micrograms per litre has led to sublethal effects and effects on long-term survival. For high bioavailability waters, effect concentrations for several sensitive species may be below 10 ug Cu/litre.

In fish, the acute lethal concentration of copper ranges from a few ug/litre to several mg/litre, depending both on test species and exposure conditions. Where the value is less than 50 ug Cu/litre, test waters generally have a low dissolved organic carbon (DOC) level, low hardness and neutral to slightly acidic pH. Exposure to concentrations ranging from one to a few hundred micrograms per litre has led to sublethal effects and effects on long-term survival. Lower effect concentrations are generally associated with test waters of high bioavailability.

In summary:

Responses expected for high concentration ranges of copper \*

Total dissolved Cu concentration range (ug/litre)	Effects of high availability in water
1- 10	Significant effects are expected for diatoms and sensitive invertebrates, notably cladocerans. Effects on fish could be significant in freshwaters with low pH and hardness.
10- 100	Significant effects are expected on various species of microalgae, some species of macroalgae, and a range of invertebrates, including crustaceans, gastropods and sea urchins. Survival of sensitive fish will be affected and a variety of fish show sublethal effects.
100- 1000	Most taxonomic groups of macroalgae and invertebrates will be severely affected. Lethal levels for most fish species will be reached.
>1000	Lethal concentrations for most tolerant organisms are reached.

continued...

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\* Sites chosen have moderate to high bioavailability similar to water used in most toxicity tests.

■ In soil, copper levels are raised by application of fertiliser, fungicides, from deposition of highway dusts and from urban, mining and industrial sources. Generally, vegetation rooted in soils reflects the soil copper levels in its foliage. This is dependent upon the bioavailability of copper and the physiological requirements of species concerned.

Typical foliar levels of copper are:

Uncontaminated soils (0.3- 250 mg/kg)	Contaminated soils (150- 450 mg/kg)	Mining/smelting soils
6.1- 25 mg/kg	80 mg/kg	300 mg/kg

Plants rarely show symptoms of toxicity or of adverse growth effects at normal soil concentrations of copper. Crops are often more sensitive to copper than the native flora, so protection levels for agricultural crops range from 25 mg Cu/kg to several hundred mg/kg, depending on country. Chronic and or acute effects on sensitive species occur at copper levels occurring in some soils as a result of human activities such as copper fertiliser addition, and addition of sludge.

When soil levels exceed 150 mg Cu/kg, native and agricultural species show chronic effects. Soils in the range 500-1000 mg Cu/kg act in a strongly selective fashion allowing the survival of only copper-tolerant species and strains. At 2000 Cu mg/kg most species cannot survive. By 3500 mg Cu/kg areas are largely devoid of vegetation cover. The organic content of the soil appears to be a key factor affecting the bioavailability of copper.

On normal forest soils, non-rooted plants such as mosses and lichens show higher copper concentrations. The fruiting bodies and mycorrhizal sheaths of soil fungi associated with higher plants in forests often accumulate copper to much higher levels than plants at the same site. International Programme on Chemical Safety (IPCS): Environmental Health Criteria 200.

■ For naphthenates:

Naphthenic acids are comprised of a large collection of saturated aliphatic and alicyclic carboxylic acids found in hydrocarbon deposits (petroleum, oil sands bitumen, and crude oils). Naphthenic acids enter surface water systems primarily through effluent discharge, but also through groundwater mixing and erosion of riverbank oil deposits. Metal naphthenates, used in a wide range of chemical applications are a further source of potential contamination.

Environmental fate

Of the possible environmental receptors (i.e., air, soil, and water), the most significant is water. The complexity of natural naphthenic acids in petroleum deposits poses an analytical challenge as reflected by the several techniques reported for quantitation of naphthenic acids in the environment. Little is established regarding degradation pathways of naphthenic acids and naphthenates in the aquatic environments. Published research related to the potential for microbiological degradation and adsorption to typical Athabasca Oil Sands soils reveal that naphthenic acids are likely to persist in the water column and, with prolonged exposure, accumulate in sediments. The bioavailability and persistence of naphthenic acids in contaminated waters are believed to be high. These compounds are highly soluble and have an extreme volatility (Henry's constant =  $8.56 \times 10^{-6}$  atm x m<sup>3</sup>/mol). Sorption to dissolved and particulate organic matter is limited by the polarity of dissolved naphthenates.

The results presented indicate that some simple naphthenic acids may be biodegradable, but many compounds in this mixture appear to resist aerobic biodegradation. The biodegradation of individual naphthenic acids decreases with increasing number of carbons (especially >17) and with an increasing degree of substitution. Microbial biodegradation does occur, although primarily for naphthenic acids with carbon numbers <17. Biological sludges especially adapted to naphthenic acids degraded 97% of these acids.

Ecotoxicity:

Data provided for naphthenic acids indicate that these acids are moderately to highly toxic to aquatic species. Concentration of naphthenic acid higher than 0.02 mg/l had unfavorable effects on the fertility of roe and survivability of the sturgeon.

**Ecotoxicity**

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
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continued...



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RS 2 Part		No data			
Toughened Acrylic Adhesive Kit - Part B #473- 427		No data			
naphtha petroleum, light, hydrotreated butyraldehyde/ aniline condensate		No data			
isopropanol	LOW	MED	LOW		HIGH
copper naphthenate		No data			

**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
Pyrolysis gasoline (containing benzene) /	199	199	(4)	(3)	(3)	(R)	(3)	(1)	1	0	(2)	2	2	TCM		FE	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 with coastal amenities,  
 For column A2: R=Readily biodegradable, NR=Not readily biodegradable.  
 For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lunginjury, N=Neurotoxic, I=Immunotoxic.  
 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

continued...

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### Section 13 - DISPOSAL CONSIDERATIONS

#### • Disposal (if all else fails)

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

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

### Section 14 - TRANSPORTATION INFORMATION



Labels Required: FLAMMABLE LIQUID  
HAZCHEM: 3[Y]E (ADG6)

#### Land Transport UNDG:

Class or division:	3	Subsidiary risk:	None
UN No.:	1993	UN packing group:	II
Shipping Name: FLAMMABLE LIQUID, N.O.S. (contains naphtha petroleum, light, hydrotreated and isopropanol)			

#### Air Transport IATA:

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	<input type="checkbox"/>
UN/ID Number:	1993	Packing Group:	II
Special provisions:	A3		
Shipping Name: FLAMMABLE LIQUID, N.O.S. *(CONTAINS NAPHTHA PETROLEUM, LIGHT, HYDROTREATED AND ISOPROPANOL)			

#### Maritime Transport IMDG:

IMDG Class:	3	IMDG Subrisk:	None
UN Number:	1993	Packing Group:	II
EMS Number:	F- E, S- E	Special provisions:	274 330 944
Limited Quantities:	1 L	Marine Pollutant:	Not Determined
Shipping Name: FLAMMABLE LIQUID, N.O.S.(contains naphtha petroleum, light, hydrotreated and isopropanol)			

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

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## Section 15 - REGULATORY INFORMATION

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### POISONS SCHEDULE: S5

### REGULATIONS

Regulations for ingredients

#### **naphtha petroleum, light, hydrotreated (CAS: 64742-49-0) is found on the following regulatory lists;**

"Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

#### **butyraldehyde/ aniline condensate (CAS: 68411-20-1) is found on the following regulatory lists;**

"Australia Inventory of Chemical Substances (AICS)"

#### **isopropanol (CAS: 67-63-0) is found on the following regulatory lists;**

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "IMO Provisional Categorization of Liquid Substances - List 2: Pollutant only mixtures containing at least 99% by weight of components already assessed by IMO", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "OECD Representative List of High Production Volume (HPV) Chemicals"

#### **copper naphthenate (CAS: 1338-02-9) is found on the following regulatory lists;**

"Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)"

#### **No data for RS 2 Part Toughened Acrylic Adhesive Kit - Part B #473-427 (CW: 18-3350)**

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## Section 16 - OTHER INFORMATION

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■ 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.

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*This is the end of the MSDS.*



**RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427**

**Chemwatch Independent Material Safety Data Sheet**

**Issue Date: 28-Nov-2008**

**NA317TC**

**CHEMWATCH 18-3349**

**Version No:2.0**

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**Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**PRODUCT NAME**

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427

**SYNONYMS**

structural, acrylic, adhesive, (meth)acrylate

**PROPER SHIPPING NAME**

CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(contains acrylic acid and methacrylic acid)

**PRODUCT USE**

Structural acrylic adhesive based on (meth)acrylates.

**SUPPLIER**

Company: RS Components	Company: RS Components
Address:	Address:
Units 30 & 31	25 Pavesi Street
Warehouse World	Smithfield
761 Great South Road	NSW2164
Penrose Auckland	AUS
	Telephone: 1300 656 636
	Emergency Tel: 1800 039 008
	Emergency Tel: 03 9573 3112
	Fax: 1300 656 696

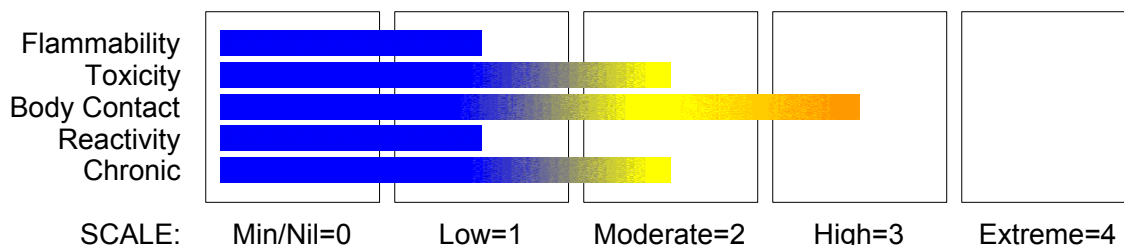
**Section 2 - HAZARDS IDENTIFICATION**

**STATEMENT OF HAZARDOUS NATURE**

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

COMBUSTIBLE LIQUID, regulated under AS1940 for Bulk Storage purposes only.

**CHEMWATCH HAZARD RATINGS**



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### Section 2 - HAZARDS IDENTIFICATION



### POISONS SCHEDULE

None

#### RISK

- Causes burns.
  - Risk of serious damage to eyes.
  - Inhalation skin contact and/or ingestion may produce health damage\*.
  - Cumulative effects may result following exposure\*.
  - Limited evidence of a carcinogenic effect\*.
  - Possible skin sensitiser\*.
- \* (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 and detergent.
- 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	%
oxa- aliphatic methacrylate ester		25-50
aliphatic methacrylate ester		12-25
acrylic acid	79-10-7	3-6
methacrylic acid	79-41-4	3-6
cumyl hydroperoxide	80-15-9	0-1

### 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.

continued...

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Section 4 - FIRST AID MEASURES

#### 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.

#### SKIN

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

#### INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prosthesis 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.
- 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

continued...

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Section 4 - FIRST AID MEASURES

- 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].

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## Section 5 - FIRE FIGHTING MEASURES

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### EXTINGUISHING MEDIA

- 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.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- 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

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- 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 containers.
- May emit acrid smoke and corrosive fumes.

Combustion products include: carbon monoxide (CO), 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: 2X

### Personal Protective Equipment

Gas tight chemical resistant suit.

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## Section 6 - ACCIDENTAL RELEASE MEASURES

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### MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable, labelled container for waste disposal.

### MAJOR SPILLS

- Chemical Class:acidic compounds, organic

For release onto land: recommended sorbents listed in order of priority.

continued...

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**Section 6 - ACCIDENTAL RELEASE MEASURES**

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

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- 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.
- 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.

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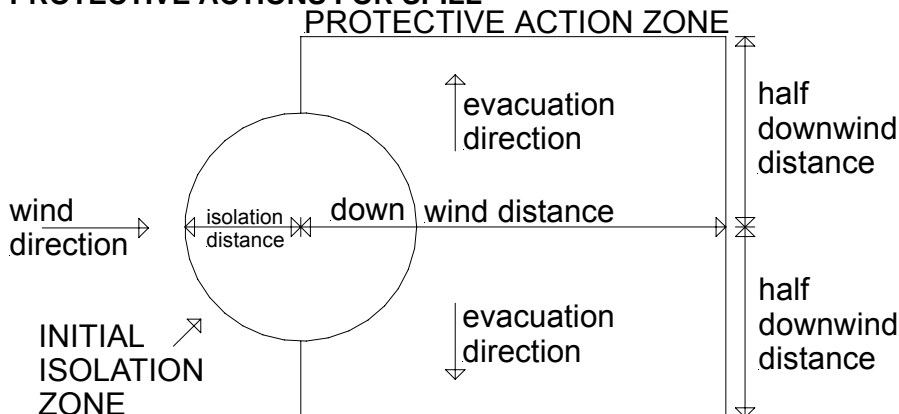
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Section 6 - ACCIDENTAL RELEASE MEASURES

## PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance	25 metres
Downwind Protection Distance	250 metres
IERG Number	36

## 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 153 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

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+) >= 0.1% Toxic (T) >= 3.0%

continued...

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### Section 6 - ACCIDENTAL RELEASE MEASURES

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.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with moisture.
- 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.

#### SUITABLE CONTAINER

- DO NOT use aluminium or galvanised containers.
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

#### STORAGE INCOMPATIBILITY

- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.
- Avoid strong bases.
- Segregate from alkalis, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

#### STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

#### SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: *May be stored together*

continued...

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Section 7 - HANDLING AND STORAGE

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 <sup>3</sup>	Notes
Australia Exposure Standards	acrylic acid (Acrylic acid)	2	5.9	Sk
Australia Exposure Standards	methacrylic acid (Methacrylic acid)	20	70	

The following materials had no OELs on our records

- cumyl hydroperoxide: CAS:80- 15- 9

**MATERIAL DATA**

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427:

Not available

**ACRYLIC ACID:**

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

For phenothiazine:

Industrial exposures at 15 to 48 mg/m<sup>3</sup> 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.

**METHACRYLIC ACID:**

- for methacrylic acid:

The recommended TLV-TWA is based on analogy with the TLV-TWA for acrylic acid and limited human and animal data. Exposure at or below this level is thought to minimise the potential for ocular or dermal irritation.

OSHA considers a skin notation is necessary to prevent dermal absorption and systemic toxicity.

**CUMYL HYDROPEROXIDE:**

- For cumyl hydroperoxide:  
CEL TWA: 1 ppm, 6 mg/m<sup>3</sup> (SKIN) (compare WEEL TWA)  
Saturated vapour concentration: 2632 ppm at 20 C.

Cumene hydroperoxide is severely irritating to the eyes and skin and is moderately toxic by ingestion, inhalation and dermal absorption. A 3-month inhalation study in rats, established a no-effect level of 31 mg/m<sup>3</sup> (5 ppm). Animals exposed to 16 ppm for 12 days experienced irritation. An environmental exposure level (WEEL) recommended by the AIHA is thought to be protective against irritation and systemic effects in

continued...

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

workers. The skin notation was included to reflect dermal absorption data.

For cumene:

Odour Threshold Value: 0.008-0.132 ppm (detection), 0.047 ppm (recognition)

Exposure at or below the TLV-TWA is thought to prevent induction of narcosis.

For acetophenone:

Odour Threshold Value: 0.17 ppm

Acetophenone produces narcosis and anaesthesia when swallowed or injected intravenously or subcutaneously. Contact with the skin produces irritation and, if confined, may burn. Eye contact may produce marked irritation and transient corneal injury depending on the extent and duration of contact.

Acute inhalation studies indicate that a saturated atmosphere (nominally 400 ppm) produced no fatalities in rats exposed for 8 hours. Whether the substance is irritating at or around the reported odour threshold is inconclusive. Subchronic oral studies indicate no effect on growth or haematology at doses of up to 10000 ppm in the diet. The TLV-TWA is thought to be protective against the potential irritant or odour effects of acetophenone.

Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

### PERSONAL PROTECTION



### EYE

- Safety glasses with 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 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. Suitability and durability of glove type is dependent on usage. Factors such as:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
  - dexterity,are important in the selection of gloves.

continued...

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### OTHER

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

#### 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	ANO- AUS P	-
1000	50	-	ANO- AUS P
5000	50	Airline *	-
5000	100	-	ANO- 2 P
10000	100	-	ANO- 3 P
	100+		Airline**

\* - Continuous Flow

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

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

#### ENGINEERING CONTROLS

■ General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

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

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

continued...

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### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

3: Intermittent, low production.  
4: Large hood or large air mass in motion

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.

Refer also to protective measures for the other component used with the product. Read both MSDS before using; store and attach MSDS together.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

#### APPEARANCE

Pale gold viscous liquid with slight sharp lingering methacrylate odour; partly mixes with water.

#### PHYSICAL PROPERTIES

Corrosive.

Acid.

Molecular Weight: Not Applicable

Specific Gravity (water=1): Not Available

pH (1% solution): Not Available

Evaporation Rate: Not Available

Lower Explosive Limit (%): Not Available

Decomposition Temp (°C): Not Available

Boiling Range (°C): Not Available

Solubility in water (g/L): Partly Miscible

Vapour Pressure (kPa): 0.1 @ 20 deg C

Relative Vapour Density (air=1): Not Available

Upper Explosive Limit (%): Not Available

State: LIQUID

Melting Range (°C): Not Available

pH (as supplied): 3- 5

Volatile Component (%vol): Not Available

Flash Point (°C): > 100

Autoignition Temp (°C): Not Available

Viscosity: 22000 cSt@40°C

### Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

#### CONDITIONS CONTRIBUTING TO INSTABILITY

• 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

■ Accidental ingestion of the material may be damaging to the health of the individual.

Ingestion of acidic corrosives may produce circumoral burns with a distinct discolouration of the mucous membranes of the mouth, throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may

continued...

also be evident. Oedema of the epiglottis may produce respiratory distress and possibly, asphyxia. Nausea, vomiting, diarrhoea and a pronounced thirst may occur. More severe exposures may produce a vomitus containing fresh or dark blood and large shreds of mucosa. Shock, with marked hypotension, weak and rapid pulse, shallow respiration and clammy skin may be symptomatic of the exposure. Circulatory collapse may, if left untreated, result in renal failure. Severe cases may show gastric and oesophageal perforation with peritonitis, fever and abdominal rigidity. Stricture of the oesophageal, gastric and pyloric sphincter may occur as within several weeks or may be delayed for years. Death may be rapid and often results from asphyxia, circulatory collapse or aspiration of even minute amounts. Delayed deaths may be due to peritonitis, severe nephritis or pneumonia. Coma and convulsions may be terminal.

### **EYE**

■ Direct eye contact with acid corrosives may produce pain, lachrymation, photophobia and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possible irreversible damage. The appearance of the burn may not be apparent for several weeks after the initial contact. The cornea may ultimately become deeply vascularised and opaque resulting in blindness.

### **SKIN**

■ Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

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.

Open cuts, abraded or irritated skin should not be exposed to this material.

Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds 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.

Acidic corrosives produce respiratory tract irritation with coughing, choking and mucous membrane damage. Symptoms of exposure may include dizziness, headache, nausea and weakness. In more severe exposures, pulmonary oedema may be evident either immediately or after a latent period of 5-72 hours. Symptoms of pulmonary oedema include a tightness in the chest, dyspnoea, frothy sputum and cyanosis. Examination may reveal hypotension, a weak and rapid pulse and moist rates. Death, due to anoxia, may occur several hours after onset of the pulmonary oedema.

### **CHRONIC HEALTH EFFECTS**

■ Repeated or prolonged exposure to acids may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis.

On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There exists limited evidence that shows that skin contact with the material is capable either of inducing a sensitisation reaction in a significant number of individuals, and/or of producing positive response in experimental animals.

### **TOXICITY AND IRRITATION**

■ Not available. Refer to individual constituents.

#### **ACRYLIC ACID:**

■ 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

#### **IRRITATION**

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### Section 11 - TOXICOLOGICAL INFORMATION

Oral (Mouse) LD50: 2400 mg/kg

Inhalation (Mouse) LC50: 5300 mg/m<sup>3</sup>/2h

Intraperitoneal (Mouse) LD50: 144 mg/kg

Subcutaneous (Mouse) LD50: 1590 mg/kg

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

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The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

#### METHACRYLIC ACID:

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

#### TOXICITY

Oral (rat) LD50: 1060 mg/kg

Oral (mouse) LD50: 1332 mg/kg

Intraperitoneal (mouse) LD50: 48 mg/kg

Oral (rabbit) LD50: 1200 mg/kg

Dermal (rabbit) LD50: 500 mg/kg

#### IRRITATION

Nil Reported

Skin (g.pig) LD50: 1000 mg/kg

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

Acute toxicity: MAA is rapidly absorbed in rats after oral and inhalation administration. Oral LD50 values of 1320-2260 mg/kg for rats, a dermal LD50 value between 500 and 1000 mg/kg for rabbits and a LC50 (rat) of 7.1 mg/l/4h were determined. The main clinical sign in animal tests on acute toxicity of MAA is severe irritancy at the site of contact. MAA causes adverse effects at the site of application, depending on the concentration and frequency or time of exposure. The undiluted acid causes skin and eye corrosion and respiratory tract lesions.

MAA is not sensitising as demonstrated by human experience and by animal tests.

Repeat dose toxicity: The main effect of MAA in acute and subchronic animal studies is irritation/corrosivity at the site of contact. In repeated dose inhalation studies the relevant toxic effect was irritation of the nasal mucosa. Rhinitis was observed in rats >20 ppm (71.4 mg/m<sup>3</sup>) and mice at 300 ppm (1071 mg/m<sup>3</sup>) when animals were exposed on 90 days. Additionally, in mice degenerative lesions of the olfactory epithelium occurred at doses from 100 ppm (357 mg/m<sup>3</sup>). A NOAEL for the local effects of 20 ppm (71.4 mg/m<sup>3</sup>) was derived from a study on mice. The NOAEC for systemic toxic effects was identified to be 100 ppm in mice and 300 ppm in rats. Toxic effects after dermal or oral application routes are unknown.

Genotoxicity: MAA is negative in a bacterial gene mutation test. Taking into consideration the data on the methyl ester of MAA (methyl methacrylate, MMA) - which indicate that MMA does not express a genotoxic potential in vivo - it is unlikely that MMA produces genetic damage.

Carcinogenicity: No cancer studies on MAA are available. Focal hyperplasia of the respiratory epithelium or lymphatic hyperplasia of mandibular lymph nodes in a 90-day inhalation study were not interpreted as a preneoplastic lesion but considered to represent reactive or inflammatory processes due to the irritant effect of MAA. With respect to MMA data, there is no concern on carcinogenic properties of MAA.

Reproductive toxicity: Data on reproductive toxicity of MAA in animals or humans does not exist. From studies with MMA no concern in relation to reproductive toxicity of MAA has to be assumed.

Where no "official" classification for acrylates and methacrylates exists, there has been cautious attempts to create classifications in the absence of contrary evidence. For example

Monoalkyl or monoarylestere of acrylic acids should be classified as R36/37/38 and R51/53

Monoalkyl or monoaryl estere of methacrylic acid should be classified as R36/37/38.

The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

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# RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427

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### Section 11 - TOXICOLOGICAL INFORMATION

The material may produce respiratory tract irritation. Symptoms of pulmonary irritation may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation.

Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).

The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs. Therefore prolonged exposure to respiratory irritants may cause sustained breathing difficulties.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

Based on the available oncogenicity data and without a better understanding of the carcinogenic mechanism the Health and Environmental Review Division (HERD), Office of Toxic Substances (OTS), of the US EPA previously concluded that all chemicals that contain the acrylate or methacrylate moiety ( $\text{CH}_2=\text{CHCOO}$  or  $\text{CH}_2=\text{C}(\text{CH}_3)\text{COO}$ ) should be considered to be a carcinogenic hazard unless shown otherwise by adequate testing.

This position has now been revised and acrylates and methacrylates are no longer de facto carcinogens.

#### CUMYL HYDROPEROXIDE:

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

#### TOXICITY

Oral (rat) LD50: 382 mg/kg

Inhalation (rat) LC50: 220 ppm/4h

Dermal (rat) LD50: 500 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 a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

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.

Bacterial cell mutagen

Equivocal tumorigen by RTECS criteria

#### IRRITATION

Skin (rabbit): 500 mg - Mild

Eye (rabbit): 1 mg

#### CARCINOGEN

Acrylic acid

International Agency  
for Research on Cancer  
(IARC) - Agents  
Reviewed by the IARC  
Monographs

Group

3

#### SKIN

acrylic acid

Australia Exposure Standards - Skin

Notes

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continued...

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**Section 12 - ECOLOGICAL INFORMATION**


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Refer to data for ingredients, which follows:

ACRYLIC ACID:

CUMYL HYDROPEROXIDE:

■ 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.

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CUMYL HYDROPEROXIDE:

METHACRYLIC ACID:

ACRYLIC ACID:

■ DO NOT discharge into sewer or waterways.

ACRYLIC ACID:

METHACRYLIC ACID:

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

RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427:

Marine Pollutant: Not Determined

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.

■ For acrylic acid (AA):

log Koc : 1.42

Half-life (hr) air : 6.6

Henry's atm m<sup>3</sup> /mol: 3.20E-07

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

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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\*.

**METHACRYLIC ACID:**

■ BOD5: 89

■ ThOD: 1.67

■ For methacrylic acid (MAA)

log Kow : 0.93

Koc : 76

BOD 5 : 0.89

ThOD : 1.67

BCF : 3

Environmental fate:

MAA has a water solubility of 89 g/l, a vapour pressure of 0.9 hPa and a log Kow of 0.93.

According to the physico-chemical properties the target compartment for this substance is the hydrosphere.

MAA is stable in neutral solution and is classified as "readily biodegradable". There is no considerable potential for bio- or geoaccumulation.

An atmospheric half-life of 11 h was calculated for this substance.

Ecotoxicity:

Fish LC50 (96 h): Oncorhynchus mykiss 85 mg/l

Daphnia magna EC50 (48 h): 100-180 mg/l

Daphnia magna NOEC (21 d): 53 mg/l

Algae EC50 (72 h): Selenastrum capricornutum 45 mg/l; EC10 (72 h): 8.2 mg/l

Based on these data there is a moderate hazard concern to aquatic organisms. With an assessment factor of 50 a PNEC of 164 ug/l is determined.

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

Source of unsaturated substances

Occupants (exhaled breath, ski oils, personal care products)

Soft woods, wood flooring, including cypress, cedar and silver fir boards, houseplants

Unsaturated substances (Reactive Emissions)

Isoprene, nitric oxide, squalene, unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products

Isoprene, limonene, alpha-pinene, other terpenes and sesquiterpenes

Major Stable Products produced following reaction with ozone.

Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, 6MHQ, geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid. Formaldehyde, 4- AMC, pinoaldehyde, pinic acid, pinonic acid, formic acid,

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Carpets and carpet backing	4- Phenylcyclohexene, 4-vinylcyclohexene, styrene, 2-ethylhexyl acrylate, unsaturated fatty acids and esters	methacrolein, methyl vinyl ketone, SOAs including ultrafine particles Formaldehyde, acetaldehyde, benzaldehyde, hexanal, nonanal, 2- nonenal
Linoleum and paints/polishes containing linseed oil	Linoleic acid, linolenic acid	Propanal, hexanal, nonanal, 2-heptenal, 2- nonenal, 2-decenal, 1- pentene- 3- one, propionic acid, n- butyric acid
Latex paint Certain cleaning products, polishes, waxes, air fresheners	Residual monomers Limonene, alpha- pinene, terpinolene, alpha- terpineol, linalool, linalyl acetate and other terpenoids, longifolene and other sesquiterpenes	Formaldehyde Formaldehyde, acetaldehyde, glycoaldehyde, formic acid, acetic acid, hydrogen and organic peroxides, acetone, benzaldehyde, 4- hydroxy- 4- methyl- 5- hexen- 1- al, 5- ethenyl- dihydro- 5- methyl- 2(3H)- furanone, 4- AMC, SOAs including ultrafine particles
Natural rubber adhesive	Isoprene, terpenes	Formaldehyde, methacrolein, methyl vinyl ketone
Photocopier toner, printed paper, styrene polymers Environmental tobacco smoke	Styrene Styrene, acrolein, nicotine	Formaldehyde, benzaldehyde
Soiled clothing, fabrics, bedding	Squalene, unsaturated sterols, oleic acid and other saturated fatty acids	Formaldehyde, benzaldehyde, hexanal, glyoxal, N- methylformamide, nicotinaldehyde, cotinine
Soiled particle filters	Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles	Acetone, geranyl acetone, 6MHO, 40PA, formaldehyde, nonanal, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid
Ventilation ducts and duct liners	Unsaturated fatty acids and esters, unsaturated oils, neoprene	Formaldehyde, nonanal, and other aldehydes; azelaic acid; nonanoic acid; 9- oxo- nonanoic acid and other oxo- acids; compounds with mixed functional groups (=O, - OH, and - COOH) C5 to C10 aldehydes
" Urban grime"	Polycyclic aromatic hydrocarbons	Oxidized polycyclic aromatic hydrocarbons
Perfumes, colognes, essential oils (e.g. lavender, eucalyptus, tea tree)	Limonene, alpha- pinene, linalool, linalyl acetate, terpinene- 4- ol, gamma- terpinene	Formaldehyde, 4- AMC, acetone, 4- hydroxy- 4- methyl- 5- hexen- 1- al, 5- ethenyl- dihydro- 5- methyl- 2(3H) furanone, SOAs including ultrafine particles
Overall home emissions	Limonene, alpha- pinene, styrene	Formaldehyde, 4- AMC, pinonaldehyde, acetone, pinic acid, pinonic acid, formic acid, benzaldehyde, SOAs including ultrafine particles

Abbreviations: 4-AMC, 4-acetyl-1-methylcyclohexene; 6MHQ, 6-methyl-5-heptene-2-one, 4OPA, 4-oxopentanal, SOA, Secondary Organic Aerosols

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

■ Ecotoxicity of acrylates is a function of n-octanol/ water partition coefficient (log Pow, log Kow).

continued...

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Compounds with a log Pow >5 exhibit simple narcosis, but at lower log Pow the toxicity of acrylates is greater than predicted for simple narcotics.

If released to surface water, acrylic acid and the acrylic esters would all be rapidly biodegraded while a portion would volatilise to the air. Acrylic acid was shown to rapidly biodegrade aerobically in soil (t1/2 < 1 day). Volatilised acrylic acid and acrylic esters are predicted to degrade rapidly by atmospheric photo-oxidation with estimated half-lives of 2 to 24 h.

The mobility in soil of acrylic acid and its esters ranged from 'medium' to 'very high'. Calculated bioconcentration factors ranged from 1 to 37, suggesting a low bioconcentration potential. Acrylic acid and methyl acrylate showed limited biodegradability in the five day biochemical oxygen demand (BOD5) test, while ethyl acrylate and butyl acrylate were degraded easily (77% and 56%, respectively). Using the OECD method 301D 28-d closed bottle test, degradability for acrylic acid was 81% at 28 days, while the acrylic esters ranged from 57% to 60%. Acrylic acid degraded rapidly to carbon dioxide in soil (t1/2<1 day).

According to classification procedures developed by the US EPA, the acute toxicity of acrylic acid to fish and invertebrates ranged from 'slightly' toxic to 'practically non-toxic'. The acute toxicity of the acrylic esters was 'moderately' toxic. Effects on algae of these compounds could not be judged from static tests due to the extensive biodegradation and volatilisation that occurred during the tests. Toxicity tests were conducted using freshwater and marine fish, invertebrates, and algae. Acrylic acid effect concentrations for fish and invertebrates ranged from 27 to 236 mg/l. Effect concentrations (LC50 or EC50) for fish and invertebrates using methyl acrylate, ethyl acrylate, and butyl acrylate ranged from 1.1 to 8.2 mg/l. The chronic maximum acceptable toxicant concentration (MATC) for acrylic acid with *Daphnia magna* was 27 mg/l based on length and young produced per adult reproduction day and for ethyl acrylate was 0.29 mg/l based on both the reproductive and growth endpoints. MATC values represent an approximate threshold of chronic effects to an organism.

Overall these studies show that acrylic acid and the acrylic esters studied can rapidly biodegrade, have a low potential for persistence or bioaccumulation in the environment, and have low to moderate toxicity.

C. A. Staples et al; Chemosphere Vol 40, January 2000, pp 29-38.

**CUMYL HYDROPEROXIDE:**

■ Half- life Soil - High (hours):	672
■ Half- life Soil - Low (hours):	168
■ Half- life Air - High (hours):	130
■ Half- life Air - Low (hours):	13
■ Half- life Surface water - High (hours):	672
■ Half- life Surface water - Low (hours):	168
■ Half- life Ground water - High (hours):	1344
■ Half- life Ground water - Low (hours):	336
■ Aqueous biodegradation - Aerobic - High (hours):	672
■ Aqueous biodegradation - Aerobic - Low (hours):	168
■ Aqueous biodegradation - Anaerobic - High (hours):	2688
■ Aqueous biodegradation - Anaerobic - Low (hours):	672
■ Photolysis maximum light absorption - High (nano- m):	264
■ Photolysis maximum light absorption - Low (nano- m):	242
■ Photooxidation half- life air - High (hours):	130
■ Photooxidation half- life air - Low (hours):	13

■ Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Effects on algae and plankton: non tox algae 1-2mg/L

**Ecotoxicity**

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
RS 2 Part Toughened Acrylic Adhesive Kit - Part A #473- 427		No data		
acrylic acid	LOW	LOW	LOW	HIGH
methacrylic acid	LOW	No data	LOW	HIGH
cumyl hydroperoxide	LOW	MED	LOW	MED

continued...

# RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427

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Section 12 - ECOLOGICAL INFORMATION

### 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 licenced land-fill 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  
HAZCHEM: 2X (ADG6)

#### Land Transport UNDG:

Class or division:	8	Subsidiary risk:	None
UN No.:	3265	UN packing group:	III
Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains acrylic acid and methacrylic acid)			

#### Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	3265	Packing Group:	III
Special provisions:	A3		
Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. *(CONTAINS ACRYLIC ACID AND METHACRYLIC ACID)			

#### Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	3265	Packing Group:	III
EMS Number:	F- A, S- B	Special provisions:	223 274 944
Limited Quantities:	5 L	Marine Pollutant:	Not Determined
Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(contains acrylic acid and methacrylic acid)			

### Section 15 - REGULATORY INFORMATION

**POISONS SCHEDULE: None**

#### REGULATIONS

Regulations for ingredients

**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

continued...

## RS 2 PART TOUGHENED ACRYLIC ADHESIVE KIT - PART A #473-427

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### Section 15 - REGULATORY INFORMATION

High Volume Industrial Chemical List (HVICL),"Australia Inventory of Chemical Substances (AICS)","Australia National Pollutant Inventory","GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships","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"

#### **methacrylic acid (CAS: 79-41-4) 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 Inventory of Chemical Substances (AICS)","GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","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"

#### **cumyl hydroperoxide (CAS: 80-15-9) is found on the following regulatory lists;**

"Australia - Victoria Occupational Health and Safety Regulations - Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 2","Australia Dangerous Goods Code (ADG Code) - Goods Too Dangerous To Be Transported","Australia Hazardous Substances","Australia Inventory of Chemical Substances (AICS)","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals"

**No data for RS 2 Part Toughened Acrylic Adhesive Kit - Part A #473-427 (CW: 18-3349)**

### 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.

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*This is the end of the MSDS.*