



## RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 1 of 27

### Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT NAME

RS PRE-BOND1 SURFACE PREP CLEANER #144-377

#### PROPER SHIPPING NAME

FLAMMABLE LIQUID, N.O.S.(contains toluene and ethyl acetate)

#### 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.  
Cleaner.

#### SUPPLIER

Company: RS Components  
Address:  
Units 30 & 31  
Warehouse World  
761 Great South Road  
Penrose Auckland

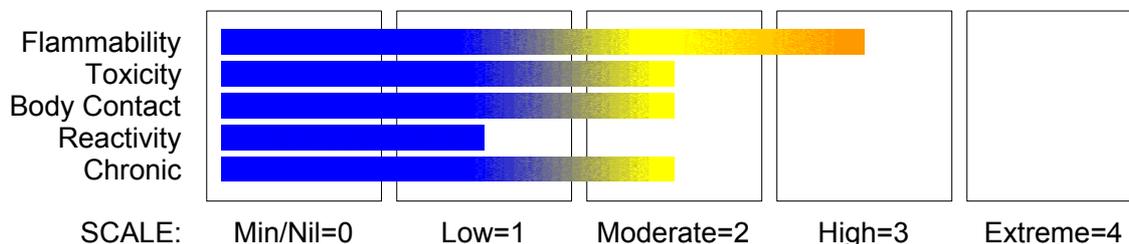
Company: RS Components  
Address:  
25 Pavesi Street  
Smithfield  
NSW2164  
AUS  
Telephone: 1300 656 636  
Emergency Tel: 1800 039 008  
Emergency Tel: 03 9573 3112  
Fax: 1300 656 696

### Section 2 - HAZARDS IDENTIFICATION

#### STATEMENT OF HAZARDOUS NATURE

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

#### CHEMWATCH HAZARD RATINGS



continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 2 of 27  
Section 2 - HAZARDS IDENTIFICATION



## POISONS SCHEDULE

S6

### RISK

- Highly flammable.
  - Harmful if swallowed.
  - Irritating to eyes and skin.
  - Harmful: danger of serious damage to health by prolonged exposure through inhalation.
  - Harmful to aquatic organisms may cause long-term adverse effects in the aquatic environment.
  - Possible risk of harm to the unborn child.
  - HARMFUL- May cause lung damage if swallowed.
  
  - Repeated exposure may cause skin dryness and cracking.
  - Vapours may cause drowsiness and dizziness.
  
  - Inhalation and/or skin contact may produce health damage\*.
  
  - Cumulative effects may result following exposure\*.
  
  - May produce discomfort of the respiratory system\*.
  - Limited evidence of a carcinogenic effect\*.
- \* (limited evidence).

### SAFETY

- Keep away from sources of ignition. No smoking.
- Do not breathe gas/fumes/vapour/spray.
- Use only in well ventilated areas.
- Keep container in a well ventilated place.
  
- Avoid exposure - obtain special instructions before use.
  
- Do not empty into drains.
- To clean the floor and all objects contaminated by this material use water and detergent.
- Keep container tightly closed.
  
- 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.
- If swallowed IMMEDIATELY contact Doctor or Poisons Information Centre. (show this container or label).
- This material and its container must be disposed of as hazardous waste.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
ethyl acetate	141-78-6	30-60
heptane and isomers		5-10
hexane, mixer of isomers		1-5
methylcyclohexane	108-87-2	1-5
n- hexane	110-54-3	<1
n- pentane	109-66-0	<1
toluene	108-88-3	30-60

## Section 4 - FIRST AID MEASURES

### SWALLOWED

- If swallowed do NOT induce vomiting.

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 3 of 27

Section 4 - FIRST AID MEASURES

- 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 simple esters:

## BASIC TREATMENT

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

## ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 4 of 27

Section 4 - FIRST AID MEASURES

- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

## EMERGENCY DEPARTMENT

- Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- Consult a toxicologist as necessary.

BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed

Following acute or short term repeated exposures to toluene:

- Toluene is absorbed across the alveolar barrier, the blood/air mixture being 11.2/15.6 (at 37 degrees C.) The concentration of toluene, in expired breath, is of the order of 18 ppm following sustained exposure to 100 ppm. The tissue/blood proportion is 1/3 except in adipose where the proportion is 8/10.
- Metabolism by microsomal mono-oxygenation, results in the production of hippuric acid. This may be detected in the urine in amounts between 0.5 and 2.5 g/24 hr which represents, on average 0.8 gm/gm of creatinine. The biological half-life of hippuric acid is in the order of 1-2 hours.
- Primary threat to life from ingestion and/or inhalation is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (eg 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 or pCO<sub>2</sub> > 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial damage 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 (adrenaline) 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.

## BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
o- Cresol in urine	0.5 mg/L	End of shift	B
Hippuric acid in urine	1.6 g/g creatinine	End of shift	B, NS
Toluene in blood	0.05 mg/L	Prior to last shift of workweek	

NS: Non-specific determinant; also observed after exposure to other material

B: Background levels occur in specimens collected from subjects NOT exposed.

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 5 of 27

---

## Section 5 - FIRE FIGHTING MEASURES

---

### EXTINGUISHING MEDIA

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

### FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear 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>), other pyrolysis products typical of burning organic material.

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

### FIRE INCOMPATIBILITY

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

### HAZCHEM: 3[Y]E

### PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

PVC chemical resistant type.

Respirator:

Type AXNO Filter of sufficient capacity

---

## Section 6 - ACCIDENTAL RELEASE MEASURES

---

### MINOR SPILLS

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

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
 Issue Date: 7-Feb-2008  
 NA317TC

CHEMWATCH 02-0970  
 Version No:2.0  
 CD 2009/3 Page 6 of 27

## Section 6 - ACCIDENTAL RELEASE MEASURES

- Collect residues in a flammable waste container.

### MAJOR SPILLS

■ Chemical Class: ester and ethers

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 sorbent clay - particulate	1	throw	pitchfork	R, DGC, RT
wood fiber - particulate	2	shovel	shovel	R, I, P
wood fiber - pillow	3	shovel	shovel	R, W, P, DGC
treated wood fiber - pillow	3	throw	pitchfork	R, P, DGC, RT
	3	throw	pitchfork	DGC, RT
<b>LAND SPILL - MEDIUM</b>				
cross- linked polymer - particulate	1	blower	skiloader	R, W, SS
cross- linked polymer - pillow sorbent clay - particulate	2	throw	skiloader	R, DGC, RT
polypropylene - particulate	3	blower	skiloader	R, I, P
expanded mineral - particulate	3	blower	skiloader	W, SS, DGC
wood fiber - particulate	4	blower	skiloader	R, I, W, P, DGC
	4	blower	skiloader	R, W, P, DGC

#### Legend

DGC: Not effective where ground cover is dense

R; Not reusable

I: Not incinerable

P: Effectiveness reduced when rainy

RT: Not effective where terrain is rugged

SS: Not for use within environmentally sensitive sites

W: Effectiveness reduced when windy

Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;

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

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear 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.

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

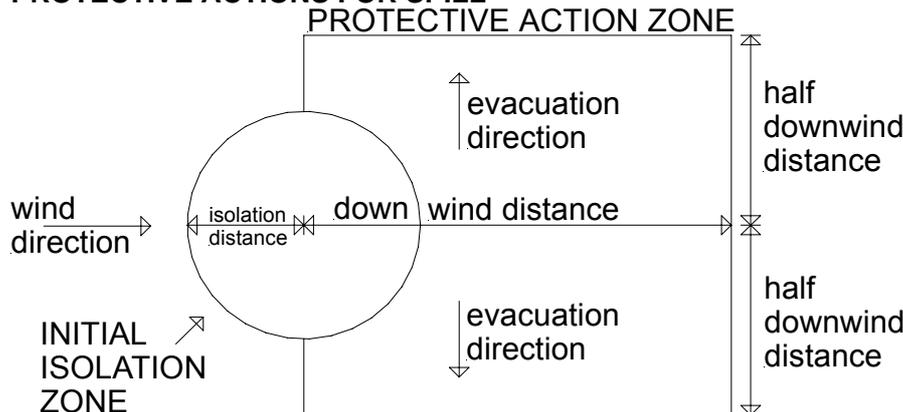
Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 7 of 27

## Section 6 - ACCIDENTAL RELEASE MEASURES

- 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.

### 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:

toluene 1000ppm

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

toluene 300ppm

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 8 of 27

Section 6 - ACCIDENTAL RELEASE MEASURES

other than mild, transient adverse effects without perceiving a clearly defined odour is:  
toluene 50ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

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

where percentage is percentage of ingredient found in the mixture

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

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- 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

- Packing as supplied by manufacturer.

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 9 of 27

Section 7 - HANDLING AND STORAGE

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

## STORAGE INCOMPATIBILITY

- Esters react with acids to liberate heat along with alcohols and acids.
- Strong oxidising acids may cause a vigorous reaction with esters that is sufficiently exothermic to ignite the reaction products.
- Heat is also generated by the interaction of esters with caustic solutions.
- Flammable hydrogen is generated by mixing esters with alkali metals and hydrides.
- Esters may be incompatible with aliphatic amines and nitrates.

## 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	ethyl acetate (Ethyl acetate)	200	720	400	1440	
Australia Exposure Standards	methylcyclohexane (Methylcyclohexane)	400	1610			
Australia Exposure Standards	n- hexane (Hexane (n-Hexane))	20	72			
Australia Exposure Standards	n- pentane (Pentane)	600	1770	750	2210	

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
 Issue Date: 7-Feb-2008  
 NA317TC

CHEMWATCH 02-0970  
 Version No:2.0  
 CD 2009/3 Page 10 of 27

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Notes
Australia Exposure Standards	toluene (Toluene)	50	191	150	574	Sk

### EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m <sup>3</sup> )	Revised IDLH Value (ppm)
ethyl acetate		2, 000 [LEL]
methylcyclohexane		1, 200 [LEL]
n- hexane		1, 100 [LEL]
n- pentane		1, 500 [LEL]
toluene		500

### 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.

### MATERIAL DATA

RS PRE-BOND1 SURFACE PREP CLEANER #144-377:

■ Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

### ETHYL ACETATE:

■ For ethyl acetate:

Odour Threshold Value: 6.4-50 ppm (detection), 13.3-75 ppm (recognition)

The TLV-TWA provides a significant margin of safety from the standpoint of adverse health effects.

Unacclimated subjects found the odour objectionably strong at 200 ppm. Mild nose, eye and throat irritation was experienced at 400 ppm. Workers exposed regularly at concentrations ranging from 375 ppm to 1500 ppm for several months showed no unusual

signs or symptoms.

Odour Safety Factor(OSF)

OSF=51 (ETHYL ACETATE).

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

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

The Odour Safety Factor (OSF) is defined as:

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

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 11 of 27

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Classification into classes follows:

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

### METHYLCYCLOHEXANE:

#### ■ For methylcyclohexane:

High concentrations produce narcosis in animals. The TLV-TWA is based on analogy with heptane, a substance exhibiting similar toxicology, and is thought to be protective against irritation. Prolonged exposure by monkeys to 370 ppm failed to produce adverse health effects.

Odour Safety Factor (OSF)

OSF=0.63 (METHYLCYCLOHEXANE).

### N-HEXANE:

#### ■ For n-hexane:

Odour Threshold Value: 65 ppm

NOTE: Detector tubes for n-hexane, measuring in excess of 100 ppm, are available commercially.

Occupational polyneuropathy may result from exposures as low as 500 ppm (as hexane), whilst nearly continuous exposures of 250 ppm have caused neurotoxic effects in animals. Many literature reports have failed to distinguish hexane from n-hexane and on the assumption that the commercial hexane contains 30% n-hexane, a worst case recommendation for TLV is assumed to reduce the risk of peripheral neuropathies (due to the metabolites 2,5-heptanedione and 3,6-octanedione) and other adverse neuropathic effects.

Concurrent exposure to chemicals (including MEK) and drugs which induce hepatic liver oxidative metabolism can reduce the time for neuropathy to appear.

Odour Safety Factor(OSF)

OSF=0.15 (n-HEXANE).

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.

### N-PENTANE:

#### ■ For n-pentane

NOTE: Detector tubes for n-pentane, measuring in excess of 100 ppm, are commercially available.

The TLV-TWA is thought to be protective against narcotic effects produced at higher concentrations and the development of axonopathies. Although the possibility exists that chronic exposure to high concentrations may produce polyneuropathy, there is no specific data to support the role of pentane in the pathogenesis of central peripheral distal axonopathy.

### TOLUENE:

#### ■ For toluene:

Odour Threshold Value: 0.16-6.7 (detection), 1.9-69 (recognition)

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 12 of 27

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

NOTE: Detector tubes measuring in excess of 5 ppm, are available.

High concentrations of toluene in the air produce depression of the central nervous system (CNS) in humans. Intentional toluene exposure (glue-sniffing) at maternally-intoxicating concentration has also produced birth defects. Foetotoxicity appears at levels associated with CNS narcosis and probably occurs only in those with chronic toluene-induced kidney failure. Exposure at or below the recommended TLV-TWA is thought to prevent transient headache and irritation, to provide a measure of safety for possible disturbances to human reproduction, the prevention of reductions in cognitive responses reported amongst humans inhaling greater than 40 ppm, and the significant risks of hepatotoxic, behavioural and nervous system effects (including impaired reaction time and incoordination). Although toluene/ethanol interactions are well recognised, the degree of protection afforded by the TLV-TWA among drinkers is not known.

Odour Safety Factor(OSF)

OSF=17 (TOLUENE).

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

### PERSONAL PROTECTION



### EYE

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

### HANDS/FEET

- 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.

### 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

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 13 of 27

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

pockets), non sparking safety footwear.

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

\* - Continuous Flow

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

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

### ENGINEERING CONTROLS

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

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

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

Within each range the appropriate value depends on:

Lower end of the range

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

Upper end of the range

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

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

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 14 of 27

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE

Clear highly flammable liquid with an organic solvent odour; insoluble in water.

### PHYSICAL PROPERTIES

Does not mix with water.

Floats on water.

Molecular Weight: Not Applicable	Boiling Range (°C): 67	Melting Range (°C): Not Available
Specific Gravity (water=1): 0.9	Solubility in water (g/L): Immiscible	pH (as supplied): Not Applicable
pH (1% solution): Not Applicable	Vapour Pressure (kPa): Not Available	Volatile Component (%vol): Not Available
Evaporation Rate: Not Available	Relative Vapour Density (air=1): Not Available	Flash Point (°C): - 25
Lower Explosive Limit (%): 1.5	Upper Explosive Limit (%): Not Available	Autoignition Temp (°C): Not Available
Decomposition Temp (°C): Not Available	State: LIQUID	Viscosity: Not Available

## 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). Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

##### EYE

■ The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 15 of 27

Section 11 - TOXICOLOGICAL INFORMATION

adequately treated.

Evidence exists, or practical experience predicts, that the material may cause severe eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Eye contact may cause significant inflammation with pain. Corneal injury may occur; permanent impairment of vision may result unless treatment is prompt and adequate. Repeated or prolonged exposure to irritants may cause inflammation characterised by a temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

## SKIN

- The material produces moderate skin irritation; evidence exists, or practical experience predicts, that the material either
  - produces moderate inflammation of the skin in a substantial number of individuals following direct contact, and/or
  - produces significant, but moderate, 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.

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

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

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

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.

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.

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

## CHRONIC HEALTH EFFECTS

- Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Serious damage (clear functional disturbance or morphological change which may have toxicological significance) is likely to be caused by repeated or prolonged exposure. As a rule the material produces, or contains a substance which produces severe lesions. Such damage may become apparent following direct application in subchronic (90 day) toxicity studies or following sub-acute (28 day) or chronic (two-year) toxicity tests.

Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, generally on the basis that results in appropriate animal studies provide strong suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 16 of 27

Section 11 - TOXICOLOGICAL INFORMATION

effects involving organs or biochemical systems.

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

Chronic toluene habituation occurs following intentional abuse (glue sniffing) or from occupational exposure. Ataxia, incoordination and tremors of the hands and feet (as a consequence of diffuse cerebral atrophy), headache, abnormal speech, transient memory loss, convulsions, coma, drowsiness, reduced colour perception, frank blindness, nystagmus (rapid, involuntary eye-movements), hearing loss leading to deafness and mild dementia have all been associated with chronic abuse. Peripheral nerve damage, encephalopathy, giant axonopathy electrolyte disturbances in the cerebrospinal fluid and abnormal computer tomographic (CT scans) are common amongst toluene addicts. Although toluene abuse has been linked with kidney disease, this does not commonly appear in cases of occupational toluene exposures. Cardiac and haematological toxicity are however associated with chronic toluene exposures. Cardiac arrhythmia, multifocal and premature ventricular contractions and supraventricular tachycardia are present in 20% of patients who abused toluene-containing paints. Previous suggestions that chronic toluene inhalation produced human peripheral neuropathy have been discounted. However central nervous system (CNS) depression is well documented where blood toluene exceeds 2.2 mg%. Toluene abusers can achieve transient circulating concentrations of 6.5 mg%. Amongst workers exposed for a median time of 29 years, to toluene, no subacute effects on neurasthenic complaints and psychometric test results could be established. The prenatal toxicity of very high toluene concentrations has been documented for several animal species and man. Malformations indicative of specific teratogenicity have not generally been found. Neonatal toxicity, described in the literature, takes the form of embryo death or delayed foetal growth and delayed skeletal system development. Permanent damage of children has been seen only when mothers have suffered from chronic intoxication as a result of "sniffing".

## TOXICITY AND IRRITATION

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

■ 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 the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

### ETHYL ACETATE:

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

#### TOXICITY

Oral (rat) LD50: 5620 mg/kg  
Inhalation (rat) LC50: 1600 ppm/8h  
Inhalation (human) TCLo: 400 ppm  
Inhalation (Human) TCLo: 400 ppm/4h  
Oral (Mouse) LD50: 4100 mg/kg  
Intraperitoneal (Mouse) LD50: 709 mg/kg  
Oral (Rabbit) LD50: 4935 mg/kg  
Oral (Guinea pig) LD50: 5500 mg/kg

#### IRRITATION

Eye (human): 400 ppm

### METHYLCYCLOHEXANE:

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

#### TOXICITY

Oral (mouse) LD50: 2250 mg/kg  
Inhalation (mouse) LC50: 41500 mg/m<sup>3</sup>/2h  
Intravenous (mouse) LD50: 234 mg/kg

#### IRRITATION

Nil Reported

### N-HEXANE:

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

#### TOXICITY

Oral (rat) LD50: 28710 mg/kg  
Inhalation (human) TCLo: 190 ppm/8W  
Inhalation (rat) LD50: 48000 ppm/4h

#### IRRITATION

Eye(rabbit): 10 mg - Mild

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 17 of 27

## Section 11 - TOXICOLOGICAL INFORMATION

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

### N-PENTANE:

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

### TOXICITY

Inhalation (human) LCLo: 130000 ppm  
Inhalation (rat) LC50: >6100 ppm  
Inhalation (human) TCLo: 90000 ppm (5m)

### IRRITATION

Nil Reported

[GENIUM and CCINFO, V.W.&R.]

### TOLUENE:

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

### TOXICITY

Oral (human) LDLo: 50 mg/kg  
Oral (rat) LD50: 636 mg/kg  
Inhalation (human) TCLo: 100 ppm  
Inhalation (man) TCLo: 200 ppm  
Inhalation (rat) LC50: >26700 ppm/1h  
Dermal (rabbit) LD50: 12124 mg/kg

### IRRITATION

Skin (rabbit):20 mg/24h- Moderate  
Skin (rabbit):500 mg - Moderate  
Eye (rabbit):0.87 mg - Mild  
Eye (rabbit): 2mg/24h - SEVERE  
Eye (rabbit):100 mg/30sec - Mild

■ 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 the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

For toluene:

#### Acute Toxicity

Humans exposed to intermediate to high levels of toluene for short periods of time experience adverse central nervous system effects ranging from headaches to intoxication, convulsions, narcosis, and death. Similar effects are observed in short-term animal studies.

Humans - Toluene ingestion or inhalation can result in severe central nervous system depression, and in large doses, can act as a narcotic. The ingestion of about 60 mL resulted in fatal nervous system depression within 30 minutes in one reported case.

Constriction and necrosis of myocardial fibers, markedly swollen liver, congestion and haemorrhage of the lungs and acute tubular necrosis were found on autopsy.

Central nervous system effects (headaches, dizziness, intoxication) and eye irritation occurred following inhalation exposure to 100 ppm toluene 6 hours/day for 4 days.

Exposure to 600 ppm for 8 hours resulted in the same and more serious symptoms including euphoria, dilated pupils, convulsions, and nausea. Exposure to 10,000-30,000 ppm has been reported to cause narcosis and death. Toluene can also strip the skin of lipids causing dermatitis.

Animals - The initial effects are instability and incoordination, lachrymation and sniffles (respiratory exposure), followed by narcosis. Animals die of respiratory failure from severe nervous system depression.

Cloudy swelling of the kidneys was reported in rats following inhalation exposure to 1600 ppm, 18-20 hours/day for 3 days.

#### Subchronic/Chronic Effects:

Repeat doses of toluene cause adverse central nervous system effects and can damage the upper respiratory system, the liver, and the kidney. Adverse effects occur as a result from both oral and the inhalation exposures. A reported lowest-observed-effect level in humans for adverse neurobehavioral effects is 88 ppm.

Humans - Chronic occupational exposure and incidences of toluene abuse have resulted in hepatomegaly and liver function changes. It has also resulted in nephrotoxicity and, in one case, was a cardiac sensitiser and fatal cardiotoxin.

Neural and cerebellar dystrophy were reported in several cases of habitual "glue sniffing." An epidemiological study in France on workers chronically exposed to toluene fumes reported leukopenia and neutropenia. Exposure levels were not given in the secondary reference; however, the average urinary excretion of hippuric acid, a metabolite of toluene, was given as 4 g/L compared to a normal level of 0.6 g/L.

Animals - The major target organs for the subchronic/chronic toxicity of toluene are the nervous system, liver, and kidney. Depressed immune response has been reported in male mice given doses of 105 mg/kg/day for 28 days. Toluene in corn oil administered to F344 male and female rats by gavage 5 days/week for 13 weeks,

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 18 of 27

## Section 11 - TOXICOLOGICAL INFORMATION

induced prostration, hypoactivity, ataxia, piloerection, lachrymation, excess salivation, and body tremors at doses 2500 mg/kg. Liver, kidney, and heart weights were also increased at this dose and histopathologic lesions were seen in the liver, kidneys, brain and urinary bladder. The no-observed-adverse effect level (NOAEL) for the study was 312 mg/kg (223 mg/kg/day) and the lowest-observed-adverse effect level (LOAEL) for the study was 625 mg/kg (446 mg/kg/day) .

### Developmental/Reproductive Toxicity

Exposures to high levels of toluene can result in adverse effects in the developing human foetus. Several studies have indicated that high levels of toluene can also adversely effect the developing offspring in laboratory animals.

Humans - Variable growth, microcephaly, CNS dysfunction, attentional deficits, minor craniofacial and limb abnormalities, and developmental delay were seen in three children exposed to toluene in utero as a result of maternal solvent abuse before and during pregnancy

Animals - Sternebral alterations, extra ribs, and missing tails were reported following treatment of rats with 1500 mg/m<sup>3</sup> toluene 24 hours/day during days 9-14 of gestation. Two of the dams died during the exposure. Another group of rats received 1000 mg/m<sup>3</sup> 8 hours/day during days 1-21 of gestation. No maternal deaths or toxicity occurred, however, minor skeletal retardation was present in the exposed fetuses. CFLP Mice were exposed to 500 or 1500 mg/m<sup>3</sup> toluene continuously during days 6-13 of pregnancy. All dams died at the high dose during the first 24 hours of exposure, however none died at 500 mg/m<sup>3</sup>. Decreased foetal weight was reported, but there were no differences in the incidences of skeletal malformations or anomalies between the treated and control offspring.

Absorption - Studies in humans and animals have demonstrated that toluene is readily absorbed via the lungs and the gastrointestinal tract. Absorption through the skin is estimated at about 1% of that absorbed by the lungs when exposed to toluene vapor.

Dermal absorption is expected to be higher upon exposure to the liquid; however, exposure is limited by the rapid evaporation of toluene .

Distribution - In studies with mice exposed to radiolabeled toluene by inhalation, high levels of radioactivity were present in body fat, bone marrow, spinal nerves, spinal cord, and brain white matter. Lower levels of radioactivity were present in blood, kidney, and liver. Accumulation of toluene has generally been found in adipose tissue, other tissues with high fat content, and in highly vascularised tissues .

Metabolism - The metabolites of inhaled or ingested toluene include benzyl alcohol resulting from the hydroxylation of the methyl group. Further oxidation results in the formation of benzaldehyde and benzoic acid. The latter is conjugated with glycine to yield hippuric acid or reacted with glucuronic acid to form benzoyl glucuronide. o-cresol and p-cresol formed by ring hydroxylation are considered minor metabolites

Excretion - Toluene is primarily (60-70%) excreted through the urine as hippuric acid. The excretion of benzoyl glucuronide accounts for 10-20%, and excretion of unchanged toluene through the lungs also accounts for 10-20%. Excretion of hippuric acid is usually complete within 24 hours after exposure.

### CARCINOGEN

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

### REPROTOXIN

toluene	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility
---------	--	-----------------------------------

### SKIN

toluene	Australia Exposure Standards - Skin	Notes	Sk
---------	-------------------------------------	-------	----

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 19 of 27

## Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

RS PRE-BOND1 SURFACE PREP CLEANER #144-377:

TOLUENE:

N-PENTANE:

N-HEXANE:

METHYLCYCLOHEXANE:

ETHYL ACETATE:

- DO NOT discharge into sewer or waterways.

METHYLCYCLOHEXANE:

N-PENTANE:

N-HEXANE:

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

RS PRE-BOND1 SURFACE PREP CLEANER #144-377:

N-PENTANE:

N-HEXANE:

METHYLCYCLOHEXANE:

- 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 PRE-BOND1 SURFACE PREP CLEANER #144-377:

METHYLCYCLOHEXANE:

- For hydrocarbons:

Environmental fate:

The lower molecular weight hydrocarbons are expected to form a "slick" on the surface of waters after release in calm sea conditions. This is expected to evaporate and enter the atmosphere where it will be degraded through reaction with hydroxy radicals.

Some hydrocarbon will become associated with benthic sediments, and it is likely to be spread over a fairly wide area of sea floor. Marine sediments may be either aerobic or anaerobic. The material, in probability, is biodegradable, under aerobic conditions (isomerised olefins and alkenes show variable results). Evidence also suggests that the hydrocarbons may be degradable under anaerobic conditions although such degradation in benthic sediments may be a relatively slow process.

Under aerobic conditions hydrocarbons degrade to water and carbon dioxide, while under anaerobic processes they produce water, methane and carbon dioxide.

Alkenes have low log octanol/water partition coefficients (Kow) of about 1 and estimated bioconcentration factors (BCF) of about 10; aromatics have intermediate values (log Kow values of 2-3 and BCF values of 20-200), while C5 and greater alkanes have fairly high values (log Kow values of about 3-4.5 and BCF values of 100-1,500)

The estimated volatilisation half-lives for alkanes and benzene, toluene, ethylbenzene, xylene (BTEX) components were predicted as 7 days in ponds, 1.5 days in rivers, and 6 days in lakes. The volatilisation rate of naphthalene and its substituted derivatives were estimated to be slower

Indigenous microbes found in many natural settings (e.g., soils, groundwater, ponds) have been shown to be capable of degrading organic compounds. Unlike other fate processes that disperse contaminants in the environment, biodegradation can eliminate the contaminants without transferring them across media.

The final products of microbial degradation are carbon dioxide, water, and microbial biomass. The rate of hydrocarbon degradation depends on the chemical composition of the product released to the environment as well as site-specific environmental factors. Generally the straight chain hydrocarbons and the aromatics are degraded more readily than the highly branched aliphatic compounds. The n-alkanes, n-alkyl aromatics, and the aromatics in the C10-C22 range are the most readily biodegradable; n-alkanes, n-alkyl aromatics, and aromatics in the C5-C9 range are biodegradable at low concentrations by some microorganisms, but are generally preferentially removed by volatilisation and thus are unavailable in most environments; n-alkanes in the C1-C4 ranges are biodegradable only by a narrow range of specialised hydrocarbon degraders; and n-alkanes, n-alkyl aromatics, and aromatics above C22 are generally not available to degrading microorganisms. Hydrocarbons with condensed ring structures, such as PAHs with four or more rings, have been shown to be

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 20 of 27

Section 12 - ECOLOGICAL INFORMATION

relatively resistant to biodegradation. PAHs with only 2 or 3 rings (e.g., naphthalene, anthracene) are more easily biodegraded. In almost all cases, the presence of oxygen is essential for effective biodegradation of oil. The ideal pH range to promote biodegradation is close to neutral (6-8). For most species, the optimal pH is slightly alkaline, that is, greater than 7.

All biological transformations are affected by temperature. Generally, as the temperature increases, biological activity tends to increase up to a temperature where enzyme denaturation occurs.

Atmospheric fate: Alkanes, isoalkanes, and cycloalkanes have half-lives on the order of 1-10 days, whereas alkenes, cycloalkenes, and substituted benzenes have half-lives of 1 day or less. Photochemical oxidation products include aldehydes, hydroxy compounds, nitro compounds, and peroxyacyl nitrates. Alkenes, certain substituted aromatics, and naphthalene are potentially susceptible to direct photolysis.

Ecotoxicity:

Based on test results, as well as theoretical considerations, the potential for bioaccumulation may be high. Toxic effects are often observed in species such as blue mussel, daphnia, freshwater green algae, marine copepods and amphipods.

The values of log Kow for individual hydrocarbons increase with increasing carbon number within homologous series of generic types. Quantitative structure activity relationships (QSAR), relating log Kow values of single hydrocarbons to toxicity, show that water solubility decreases more rapidly with increasing Kow than does the concentration causing effects. This relationship varies somewhat with species of hydrocarbon, but it follows that there is a log Kow limit for hydrocarbons, above which, they will not exhibit acute toxicity; this limit is at a log Kow value of about 4 to 5. It has been confirmed experimentally that for fish and invertebrates, paraffinic hydrocarbons with a carbon number of 10 or higher (log Kow >5) show no acute toxicity and that alkylbenzenes with a carbon number of 14 or greater (log Kow >5) similarly show no acute toxicity. QSAR equations for chronic toxicity also suggest that there should be a point where hydrocarbons with high log Kow values become so insoluble in water that they will not cause chronic toxicity, that is, that there is also a solubility cut-off for chronic toxicity. Thus, paraffinic hydrocarbons with carbon numbers of greater than 14 (log Kow >7.3) should show no measurable chronic toxicity.

RS PRE-BOND1 SURFACE PREP CLEANER #144-377:

METHYLCYCLOHEXANE:

■ Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.).

RS PRE-BOND1 SURFACE PREP CLEANER #144-377:

Marine Pollutant: Not Determined

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

ETHYL ACETATE:

■ log Pow (Verschuereen 1983):	0.66/0.73
■ ThOD:	50.4
■ log Pow (Verschuereen 1983):	0.66/0.73
■ BOD5:	15%
■ COD:	1.54 (83%)
■ ThOD:	1.82
■ Half- life Soil - High (hours):	168
■ Half- life Soil - Low (hours):	24
■ Half- life Air - High (hours):	353
■ Half- life Air - Low (hours):	35.3
■ 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
■ Aqueous biodegradation - Removal secondary treatment - High (hours):	96%
■ Aqueous biodegradation - Removal secondary treatment - Low (hours):	99.90%
■ Photooxidation half- life water - High (hours):	9.60E+05
■ Photooxidation half- life water - Low (hours):	24090

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 21 of 27

Section 12 - ECOLOGICAL INFORMATION

■ Photooxidation half- life air - High (hours):	353
■ Photooxidation half- life air - Low (hours):	35.3
■ First order hydrolysis half- life (hours):	1.77E+04
■ Acid rate constant [M(H+)- HR]- 1:	3.05E- 08
■ Base rate constant [MOH]- HR]- 1:	2.99E- 05

log Kow: 0.66-0.73  
Half-life (hr) air: 200  
Half-life (hr) H2O surface water: 10  
Henry's atm m<sup>3</sup> /mol: 1.20E-04  
BOD 5 if unstated: 0.1-1.24,16-36%  
COD: 1.54,83%  
ThOD: 1.82

## METHYLCYCLOHEXANE:

■ Fish LC50 (96hr.) (mg/l):	72
■ log Kow (Sangster 1997):	3.88
■ Algae IC50 (72hr.) (mg/l):	26- 88

BCF: 150

controlled ozone depleting gases: freeze by 1995 (C)

## N-HEXANE:

■ Hazardous Air Pollutant:	Yes
■ Fish LC50 (96hr.) (mg/l):	4 (24hr)
■ Algae IC50 (72hr.) (mg/l):	10
■ log Kow (Sangster 1997):	3.9
■ BOD5:	2.21
■ COD:	0.04
■ ThOD:	3.52

## ■ For n-hexane:

log Kow : 3.17-3.94  
BOD 5 if unstated: 2.21  
COD : 0.04  
ThOD : 3.52

## Environmental fate:

Transport and Partitioning: The physical properties of n-hexane that affect its transport and partitioning in the environment are: water solubility of 9.5 mg/L; log[Kow] (octanol/water partition coefficient), estimated as 3.29; Henry's law constant, 1.69 atm-m<sup>3</sup> mol; vapor pressure, 150 mm Hg at 25 C; and log[Koc] in the range of 2.90 to 3.61. As with many alkanes, experimental methods for the estimation of the Koc parameter are lacking, so that estimates must be made based on theoretical considerations.

The dominant transport process from water is volatilization. Based on mathematical models the half-life for n-hexane in bodies of water with any degree of turbulent mixing (e.g., rivers) would be less than 3 hours. For standing bodies of water (e.g., small ponds), a half-life no longer than one week (6.8 days) is estimated. Based on the log octanol/water partition coefficient (i.e., log[Koc]) and the estimated log sorption coefficient (i.e., log[Koc]) n-hexane is not expected to become concentrated in biota. A calculated bioconcentration factor (BCF) of 453 for a fathead minnow further suggests a low potential for n-hexane to bioconcentrate or bioaccumulate in trophic food chains.

In soil, the dominant transport mechanism for n-hexane present near the surface probably is volatilisation (based on its Henry's law constant, water solubility, vapor pressure, and Koc). While its estimated Koc values suggest a moderate ability to sorb to soil particles, n-hexane has a density (0.6603 g/mL at 20 C) well below that of water and a very low water solubility of 9.5 mg/L. n-Hexane would, therefore, be viewed as a light nonaqueous phase liquid (LNAPL), which would suggest a low potential for leaching into the lower soil depths since the n-hexane would tend to float on the top of the saturated zone of the water table. n-Hexane would generally stay near the soil surface and, if not appreciably sorbed into the soil matrix, would be expected eventually to volatilise to the atmosphere. Exceptions would involve locations with shallow groundwater tables where there were large spills of hexane products. In such cases, the n-hexane could spread out to contaminant a large volume of soil materials.

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 22 of 27

Section 12 - ECOLOGICAL INFORMATION

**Air:** n-Hexane does not absorb ultraviolet (UV) light at 290 nm and is thus not expected to undergo direct photolysis reactions. The dominant tropospheric removal mechanism for n-hexane is generally regarded to be decomposition by hydroxyl radicals. Calculations assuming typical hydroxyl radical concentrations suggest a half-life of approximately 2.9 days. While n-hexane can react with nitrogen oxides to produce ozone precursors under controlled laboratory conditions, the smog-producing potential of n-hexane is very low compared to that of other alkanes or chlorinated VOCs. Hydroxyl ion reactions in the upper troposphere, therefore, are probably the primary mechanisms for n-hexane degradation in the atmosphere. As with most alkanes, n-hexane is resistant to hydrolysis

**Water:** Although few data are available dealing explicitly with the biodegradation of n-hexane in water, neither hydrolysis nor biodegradation in surface waters appears to be rapid compared with volatilization. In surface waters, as in the atmosphere, alkanes such as n-hexane would be resistant to hydrolysis.

Biodegradation is probably the most significant degradation mechanism in groundwater. The ability of *Pseudomonas mendocina* bacteria to metabolise n-hexane in laboratory microcosms simulating groundwater conditions has been documented. Mixed bacterial cultures as well as pure cultures are documented as capable of metabolizing n-hexane under aerobic conditions. In general, linear alkanes (such as n-hexane) are viewed as the most readily biodegradable fractions in petroleum, particularly when oxygen is present in solution. Once introduced into groundwater, n-hexane may be fairly persistent since its degradation by chemical hydrolysis is slow and opportunities for biodegradation may be limited under anoxic conditions or where nutrients such as nitrogen or phosphorus are in limited supply.

**Sediment and Soil:** The most important biodegradation processes involve the conversion of the n-hexane to primary alcohols, aldehydes and, ultimately, into fatty acids. Similar processes are encountered with other light hydrocarbons such as heptane. In general, unless the n-hexane is buried at some depth within a soil or sediment, volatilisation is generally assumed to occur at a much more rapid rate than chemical or biochemical degradation processes. Once introduced into deeper sediments, n-hexane may be fairly persistent.

**Ecotoxicity:**

Fish LC50 (96 h): *Oncorhynchus mykiss* 4.14 mg/l; *Pimephales promelus* 2.5 mg/l (flow through); *Lepomis macrochirus* 4.12 mg/l

Daphnia EC50 (48 h): 3.87 mg/l.

**N-PENTANE:**

- Fish LC50 (96hr.) (mg/l): 100
- log Kow (Sangster 1997): 3.39

■ For n-pentane;

Koc : 580-1600

Half-life (hr) air : 72-108

Half-life (hr) H2O surface water : 2.5-168

Henry's atm m<sup>3</sup> /mol: 1.26

Log BCF : 1.9-2.35

**Environmental fate:**

Photolysis, hydrolysis and bioconcentration of n-pentane are not expected to be important environmental fate processes. Biodegradation of n-pentane may occur in soil and water, however volatilisation and to some extent adsorption are expected to be far more important environmental fate processes. A Koc range of 580-1600 indicates a low mobility class in soil for n-pentane. In aquatic systems n-pentane may partition from the water column to organic matter contained in sediments and suspended materials. The Henry's Law constant suggests rapid volatilisation of n-pentane from environmental waters. The volatilisation half-lives from a model river and model pond (the latter considers the effect of absorption) have been estimated to be 2.5 hrs and 3.5 days, respectively.

The log bioconcentration factor (log BCF) has been estimated to be 1.9-2.35 suggesting that n-pentane will not bioconcentrate in aquatic organisms

n-Pentane 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 (average half-life of 4.1 days). Rate constants for n-pentane were measured to be  $4.06 \times 10^{-12}$ ,  $5.30 \times 10^{-12}$  and  $3.51 \times 10^{-12}$  cm<sup>3</sup>/mol-sec at 26, 27 and 27 deg. C respectively, which correspond to atmospheric half-lives of 3.9, 3.0 and 4.5 days at an atmospheric concentration of  $5 \times 10^5$  hydroxyl radicals per cm<sup>3</sup>. Data also suggests that night-time reactions with nitrate radicals may contribute to atmospheric transformation of n-pentane especially in urban environments. Experimental data showed that 12.9% of the n-pentane fraction in a dark chamber reacted with NO<sub>3</sub> to form the corresponding alkyl nitrate.

n-Pentane does not absorb UV light in the environmentally significant range >290 nm and probably will not

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 23 of 27

Section 12 - ECOLOGICAL INFORMATION

undergo direct photolysis in the atmosphere.

Biodegradation: The theoretical oxygen demand (ThOD) of benzene acclimated activated sludge for n-pentane was 0.3, 3.2 after 6, 24 days.

Ecotoxicity:

Fish LC50 (96 h): Oncorhynchus mykiss 9.87 mg/l; Pimephales promelus 11.59 mg/l; Lepomis macrochirus 9.99 mg/l

Daphnia EC50 (48 h): 9.7 mg/l

isopentane:

Daphnia magna EC50 (48 h): 2.3 mg/l.

TOLUENE:

■ Hazardous Air Pollutant:	Yes
■ Fish LC50 (96hr.) (mg/l):	7.3- 22.8
■ BCF<100:	13.2 (EELS)
■ log Kow (Sangster 1997):	2.73
■ log Pow (Verschueren 1983):	2.69
■ BOD5:	5%
■ COD:	21%
■ ThOD:	3.13
■ Half- life Soil - High (hours):	528
■ Half- life Soil - Low (hours):	96
■ Half- life Air - High (hours):	104
■ Half- life Air - Low (hours):	10
■ Half- life Surface water - High (hours):	528
■ Half- life Surface water - Low (hours):	96
■ Half- life Ground water - High (hours):	672
■ Half- life Ground water - Low (hours):	168
■ Aqueous biodegradation - Aerobic - High (hours):	528
■ Aqueous biodegradation - Aerobic - Low (hours):	96
■ Aqueous biodegradation - Anaerobic - High (hours):	5040
■ Aqueous biodegradation - Anaerobic - Low (hours):	1344
■ Aqueous biodegradation - Removal secondary treatment - High (hours):	75%
■ Photolysis maximum light absorption - High (nano- m):	268
■ Photolysis maximum light absorption - Low (nano- m):	253.5
■ Photooxidation half- life water - High (hours):	1284
■ Photooxidation half- life water - Low (hours):	321
■ Photooxidation half- life air - High (hours):	104
■ Photooxidation half- life air - Low (hours):	10

■ For toluene:

log Kow : 2.1-3

log Koc : 1.12-2.85

Koc : 37-260

log Kom : 1.39-2.89

Half-life (hr) air : 2.4-104

Half-life (hr) H2O surface water : 5.55-528

Half-life (hr) H2O ground : 168-2628

Half-life (hr) soil : <48-240

Henry's Pa m3 /mol: 518-694

Henry's atm m3 /mol: 5.94E-03

BOD 5 0.86-2.12, 5%

COD : 0.7-2.52,21-27%

ThOD : 3.13

BCF : 1.67-380

log BCF : 0.22-3.28

Environmental fate:

Transport: The majority of toluene evaporates to the atmosphere from the water and soil. It is moderately retarded by adsorption to soils rich in organic material (Koc = 259), therefore, transport to ground water is dependent on the soil composition. In unsaturated topsoil containing organic material, it has been estimated that 97% of the toluene is adsorbed to the soil and only about 2% is in the soil-water phase and transported

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 24 of 27

## Section 12 - ECOLOGICAL INFORMATION

with flowing groundwater. There is little retardation in sandy soils and 2-13% of the toluene was estimated to migrate with flowing water; the remainder was volatilised, biodegraded, or unaccounted for. In saturated deep soils with no soil-air phase, about 48% may be transported with flowing groundwater.

Transformation/Persistence:

**Air** - The main degradation pathway for toluene in the atmosphere is reaction with photochemically produced hydroxyl radicals. The estimated atmospheric half life for toluene is about 13 hours. Toluene is also oxidised by reactions with atmospheric nitrogen dioxide, oxygen, and ozone, but these are minor degradation pathways. Photolysis is not considered a significant degradative pathway for toluene

**Soil** - In surface soil, volatilisation to air is an important fate process for toluene. Biodegradation of toluene has been demonstrated in the laboratory to occur with a half life of about 1 hour. In the environment, biodegradation of toluene to carbon dioxide occurs with a typical half life of 1-7 days.

**Water** - An important fate process for toluene is volatilization, the rate of which depends on the amount of turbulence in the surface water. The volatilisation of toluene from static water has a half life of 1-16 days, whereas from turbulent water the half life is 5-6 hours. Degradation of toluene in surface water occurs primarily by biodegradation with a half life of less than one day under favorable conditions (presence of microorganisms, microbial adaptation, and optimum temperature). Biodegradation also occurs in shallow groundwater and in salt water at a reduced rate). No data are available on anaerobic degradation of toluene in deep ground water conditions where aerobic degradation would be minimal.

**Biota** - Bioaccumulation in most organisms is limited by the metabolism of toluene into more polar compounds that have greater water solubility and a lower affinity for lipids. Bioaccumulation in the food chain is predicted to be low.

Ecotoxicity:

Toluene has moderate acute toxicity to aquatic organisms; several toxicity values are in the range of greater than 1 mg/L and 100 mg/L.

Fish LC50 (96 h): fathead minnow (*Pimephales promelas*) 12.6-72 mg/l; *Lepomis macrochirus* 13-24 mg/l; guppy (*Poecilia reticulata*) 28.2-59.3 mg/l; channel catfish (*Ictalurus punctatus*) 240 mg/l; goldfish (*Carassius auratus*): 22.8-57.68 mg/l

Crustaceans LC50 (96 h): grass shrimp (*Palaemonetes pugio*) 9.5 ppm, crab larvae stage (*Cancer magister*) 28 ppm; shrimp (*Crangon franciscorum*) 4.3 ppm; daggerblade grass shrimp (*Palaemonetes pugio*) 9.5 mg/l

Algae EC50 (24 h): green algae (*Chlorella vulgaris*) 245 mg/l (growth); (72 h) green algae (*Selenastrum capricornutum*) 12.5 mg/l (growth).

### Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
RS Pre- bond1 Surface Prep Cleaner #144- 377		No data		
ethyl acetate	LOW	HIGH	MED	HIGH
methylcyclohexane	LOW	No data	LOW	MED
n- hexane	LOW	No data	MED	MED
n- pentane	LOW	No data	LOW	HIGH
toluene	LOW	MED	LOW	MED

## 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:

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 25 of 27

## Section 13 - DISPOSAL CONSIDERATIONS

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

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

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: Burial in a 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 toluene and ethyl acetate)			

### 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 TOLUENE AND ETHYL ACETATE)			

### 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 toluene and ethyl acetate)			

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet  
Issue Date: 7-Feb-2008  
NA317TC

CHEMWATCH 02-0970  
Version No:2.0  
CD 2009/3 Page 26 of 27

## Section 15 - REGULATORY INFORMATION

### POISONS SCHEDULE: S6

### REGULATIONS

Regulations for ingredients

#### ethyl acetate (CAS: 141-78-6) 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)", "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 Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

#### methylcyclohexane (CAS: 108-87-2) is found on the following regulatory lists;

"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"

#### n-hexane (CAS: 110-54-3) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia National Pollutant Inventory", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "OECD Representative List of High Production Volume (HPV) Chemicals"

#### n-pentane (CAS: 109-66-0) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia High Volume Industrial Chemical List (HVICL)", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "OECD Representative List of High Production Volume (HPV) Chemicals"

#### toluene (CAS: 108-88-3) is found on the following regulatory lists;

"Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - organic compounds)", "Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Aquatic habitat)", "Australia - Australian Capital Territory Environment Protection Regulation Ecosystem maintenance - Organic chemicals - Non-pesticide anthropogenic organics", "Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Domestic water quality", "Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Illicit Drug Reagents/Essential Chemicals - Category III", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix F (Part 3)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix I", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6", "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", "OECD Representative List of High Production Volume (HPV) Chemicals", "United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control - Table II", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

No data for RS Pre-bond1 Surface Prep Cleaner #144-377 (CW: 02-0970)

## Section 16 - OTHER INFORMATION

### REPRODUCTIVE HEALTH GUIDELINES

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

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
n- hexane	176 mg/m3	NA	NA	NA	Yes
toluene	9.6 mg/m3	10	D	NA	-

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

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

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

continued...

# RS PRE-BOND1 SURFACE PREP CLEANER #144-377

Chemwatch Independent Material Safety Data Sheet

Issue Date: 7-Feb-2008

NA317TC

CHEMWATCH 02-0970

Version No:2.0

CD 2009/3 Page 27 of 27

Section 16 - OTHER INFORMATION

---

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive  
American Industrial Hygiene Association Journal 57: 641-649 (1996).

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

A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://www.chemwatch.net/references).

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

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

Issue Date: 7-Feb-2008

Print Date: 5-Feb-2010

*This is the end of the MSDS.*