

POWERS CHEM-STUD

Chemwatch Independent Material Safety Data Sheet

Issue Date: 14-Dec-2009

NC317ECP

CHEMWATCH 63999

Version No:4

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

POWERS CHEM-STUD

PROPER SHIPPING NAME

RESIN SOLUTION

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. Chemical anchor system for fixing into concrete, brickwork, including blockwork and stone masonry. Sealed adhesive capsule is mixed inside hole during insertion of anchor rod.

SUPPLIER

Company: Powers Fasteners Australasia Pty Ltd

Address:

Factory 3, 205 Abbots Road

Dandenong South

VIC, 3175

AUS

Telephone: +61 3 8795 4600

Fax: +61 3 8787 5899

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

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

POISONS SCHEDULE

S5

RISK

- Flammable.
- Harmful by inhalation.
- Irritating to eyes and skin.
- Limited evidence of a carcinogenic effect.
- May cause SENSITISATION by skin contact.
- HARMFUL - May cause lung damage if swallowed.

SAFETY

- 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.
- 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.

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
Glass capsule containing styrene	100-42-5	10-60
quartz granules, as graded sand	14808-60-7.	
polyester resin		
Inner phial of hardener containing dibenzoyl peroxide	94-36-0	<10

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor.
- 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.

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.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

- For acute or short term repeated exposures to styrene:

INHALATION:

- Severe exposures should have cardiac monitoring to detect arrhythmia.
- Catecholamines, especially epinephrine (adrenaline) should be used cautiously (if at all).
- Aminophylline and inhaled beta-two selective bronchodilators (e.g. salbutamol) are the drugs of choice for treatment of bronchospasm.

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Section 4 - FIRST AID MEASURES

INGESTION:

- Ipecac syrup should be given for ingestions exceeding 3ml (styrene)/kg.
- For patients at risk of aspiration because of obtundation, intubation should precede lavage.
- Pneumonitis is a significant risk. Watch the patient closely in an upright (alert patient) or left lateral head-down position (obtunded patient) to reduce aspiration potential. [Ellenhorn and Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

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

Determinant	Index	Sampling Time	Comments
1. Mandelic acid in urine	800 mg/gm creatinine	End of shift	NS
2. Phenylglyoxylic acid in urine	300 mg/gm creatinine	Prior to next shift	NS
	240 mg/gm creatinine	End of shift	NS
3. Styrene in venous blood	100 mg/gm creatinine	Prior to next shift	SQ
	0.55 mg/L	End of shift	
	0.02 mg/L	Prior to next shift	SQ

NS: Non-specific determinant; also seen after exposure to other materials.

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

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

Section 5 - FIRE FIGHTING MEASURES

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.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

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Section 5 - FIRE FIGHTING MEASURES

FIRE/EXPLOSION HAZARD

- Liquid and vapour are flammable.
- Moderate fire hazard when exposed to heat or flame.
- Vapour forms an explosive mixture with air.
- Moderate explosion hazard when exposed to heat or flame.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

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

May emit clouds of acrid smoke.

May emit poisonous fumes.

FIRE INCOMPATIBILITY

Avoid reaction with oxidising agents, strong acids, peroxides, ferrous salts, metal halides, alkalies and ultra-violet radiation.

HAZCHEM

•3Y

Personal Protective Equipment

Gas tight chemical resistant suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

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

MAJOR SPILLS

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

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

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Section 6 - ACCIDENTAL RELEASE MEASURES

life-threatening health effects is:

styrene 1000ppm

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

styrene 250ppm

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

styrene 50ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of overexposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid generation of static electricity.
- DO NOT use plastic buckets.
- Earth all lines and equipment.
- Use spark-free tools when handling.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

SUITABLE CONTAINER

- 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.

STORAGE INCOMPATIBILITY

Segregate from strong acids, strong oxidisers, reducing agents, metals, metal oxides and amines.

STORAGE REQUIREMENTS

- Store in original containers in approved flammable liquid storage area.

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Section 7 - HANDLING AND STORAGE

- Store away from incompatible materials in a cool, dry, well-ventilated area.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- No smoking, naked lights, heat or ignition sources.
- Storage areas should be clearly identified, well illuminated, clear of obstruction and accessible only to trained and authorised personnel - adequate security must be provided so that unauthorised personnel do not have access.
- Store according to applicable regulations for flammable materials for storage tanks, containers, piping, buildings, rooms, cabinets, allowable quantities and minimum storage distances.
- Use non-sparking ventilation systems, approved explosion proof equipment and intrinsically safe electrical systems.
- Have appropriate extinguishing capability in storage area (e.g. portable fire extinguishers - dry chemical, foam or carbon dioxide) and flammable gas detectors.
- Keep adsorbents for leaks and spills readily available.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

In addition, for tank storages (where appropriate):

- Store in grounded, properly designed and approved vessels and away from incompatible materials.
 - For bulk storages, consider use of floating roof or nitrogen blanketed vessels; where venting to atmosphere is possible, equip storage tank vents with flame arrestors; inspect tank vents during winter conditions for vapour/ ice build-up.
 - Storage tanks should be above ground and diked to hold entire contents.
- Inhibitor level should be regularly checked to maintain stability.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³
Australia Exposure Standards	styrene (Styrene, monomer)	50	213	100	426
Australia Exposure Standards	dibenzoyl peroxide (Benzoyl peroxide)		5		

The following materials had no OELs on our records

- graded sand: CAS:14808- 60- 7

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
styrene		700
graded sand	50	
dibenzoyl peroxide	1, 500	

MATERIAL DATA

POWERS CHEM-STUD:

Not available

STYRENE:

- for styrene:

Odour Threshold: 0.017 to 1.9 with a geometric average threshold of 0.32 ppm.

NOTE:Detector tubes measuring styrene at greater than 10 ppm are available.

The recommended TLV-TWA and STEL is based on the influence of styrene exposure on the central and peripheral nervous systems At the TWA, total daily styrene exposure to the standard 70 kg medium-frame man who inhales 10 m³ and who retains 70% of the inspired compound is 21 mg/kg with 0.5 mg/kg absorbed through the skin. The total absorbed dose can be increased six-fold with physical work and increased respiration rate.

Measurement of styrene and its metabolites in the urine can be an indication of recent exposure though

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

this approach may be limited by factors such as the influence of alcohol consumption on styrene pharmacodynamics. Exposure at or below the TLV-TWA is thought to protect the worker against the significant risks of narcosis, neuropathies and irritation although other findings suggest that neuro-optical effects are significant amongst workers exposed at 4 ppm.

Odour Safety Factor(OSF)

OSF=63 (STYRENE).

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

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

The Odour Safety Factor (OSF) is defined as:

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

Classification into classes follows:

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

GRADED SAND:

NOTE: This product contains negligible amount of respirable dust.

DIBENZOYL PEROXIDE:

■ For benzoyl peroxide:

The recommendation for the TLV-TWA is based on the absence of subjective symptoms of irritation of the nose and throat in humans exposed to 5.25 mg/m³. Whether this is sufficiently low to prevent cumulative effects in man is not known.

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].

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber.

NOTE:

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

OTHER

- Overalls.
- Barrier cream
- Eyewash unit.

RESPIRATOR

■ Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	A- AUS	-
1000	50	-	A- AUS
5000	50	Airline *	-
5000	100	-	A- 2
10000	100	-	A- 3
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult 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.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Outer glass capsule of light-yellow liquid containing polyester resin, graded sand (quartz) and styrene and an inner glass vial of dibenzoyl peroxide hardener.

When broken has a typical aromatic odour and very little solubility in water.

PHYSICAL PROPERTIES

Liquid.

Does not mix with water.

State	Liquid	Molecular Weight	Not Applicable
Melting Range (°C)	Not Available	Viscosity	Not Available
Boiling Range (°C)	145 (styrene)	Solubility in water (g/L)	Immiscible
Flash Point (°C)	34	pH (1% solution)	Not Applicable
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not Applicable
Autoignition Temp (°C)	Not Available	Vapour Pressure (kPa)	Not Available

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Upper Explosive Limit (%)	6.1 (styrene)	Specific Gravity (water=1)	Not Available
Lower Explosive Limit (%)	1.1 (styrene)	Relative Vapour Density (air=1)	3.6 (styrene)
Volatile Component (%vol)	Not Available	Evaporation Rate	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

- Not normally a hazard due to physical form of product.

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

Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

EYE

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

The vapour when concentrated has pronounced eye irritation effects and this gives some warning of high vapour concentrations. If eye irritation occurs seek to reduce exposure with available control measures, or evacuate area.

SKIN

- The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.

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

Toxic effects may result from skin absorption.

Dermal absorption of styrene has been shown to be significantly less than absorption by the respiratory tract.

INHALED

- Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.

Inhalation hazard is increased at higher temperatures.

Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

If exposure to highly concentrated vapour atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and unless resuscitated - death.

During curing a small amount of vapour may be emitted from the small exposed surface of the hole.

CHRONIC HEALTH EFFECTS

- There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

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Section 11 - TOXICOLOGICAL INFORMATION

Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.

Exposure to styrene may aggravate central nervous system disorders, chronic respiratory disease, skin disease, kidney disease and liver disease. Exposure to styrene at work causes effects on the nervous system. It causes a reversible loss in the ability to tell apart colours, and effects on hearing have been reported. Animal testing has revealed toxicity to the lung and nose. It is unclear whether styrene can cause miscarriage. Styrene can cause chromosomal damage, but there is little evidence that it causes congenital deformities in humans.

Exposure occurs only when glass container is broken during initial mixing and application. Little vapour hazard during curing is likely from the small exposure surface of the hole.

High vapour concentrations may have a toxic and anaesthetic effects, which may lead to unconsciousness or death. At 400-1000 ppm, the vapour may produce systemic effects such as dizziness, nausea and headache.

TOXICITY AND IRRITATION

■ Not available. Refer to individual constituents.

STYRENE:

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

TOXICITY

Oral (Rat) LD50: 2650 mg/kg

Intraperitoneal (Rat) LD50: 898 mg/kg

Oral (Mouse) LD50: 316 mg/kg

Inhalation (Mouse) LC50: 9500 mg/m³/4h

Intraperitoneal (Mouse) LD50: 660 mg/kg

Intravenous (Mouse) LD50: 90 mg/kg

Inhalation (Rabbit) LC: 4000 ppm/4h

Inhalation (Rat) LC50: 24000 mg/m³/4h

Inhalation (Human) LCLo: 10000 ppm/30 m

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

WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

DIBENZOYL PEROXIDE:

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

TOXICITY

Oral (rat) LD50: 7710 mg/kg

Inhalation (human) TCLo: 12 mg/m³

Subcutaneous (Rat) LD: 40 mg/kg (@ 50%)

Intraperitoneal (Mouse) LD50: 440 mg/kg

Intravenous (Rabbit) LD: 16 mg/kg

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

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

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

For benzoyl peroxide:

The acute oral toxicity of benzoyl peroxide is very low: LD50 >2,000 mg/kg bw in mice, and 5,000 mg/kg bw in rats. No deaths occurred in male rats following inhalation of 24.3 mg/L. Visible effects included eye squint, dyspnea, salivation, lacrimation, erythema and changes of respiratory rates and motor activity.

Benzoyl peroxide was slightly irritating to skins in 24 hr-patch tests. Benzoyl peroxide was not irritating

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Section 11 - TOXICOLOGICAL INFORMATION

to the eyes of rabbits if washed out within 5 minutes after instillation, however, if the chemical was not washed out until 24 hours later, it proved to be irritating.

Positive results from sensitisation tests in guinea pigs and mice, and from a maximization test in human volunteers, indicate that benzoyl peroxide is a skin sensitiser.

In the combined repeated dose and reproduction/developmental toxicity study (OECD TG 422), benzoyl peroxide did not produce hematological or biochemical adverse effects. Repeated administration by oral gavage up to 1,000 mg/kg bw/day for 29 days resulted in decreased weights of testes and epididymis in male rats. The NOAEL for repeated dose toxicity was 500 mg/kg bw/day.

This substance did not cause gene mutation in bacteria (OECD TG 471 & 472) and in vitro chromosomal aberration in CHL (Chinese Hamster Lung) cells. An in vivo mammalian erythrocytes micronucleus test (OECD TG 474) produced negative result. The available evidence supports the conclusion that benzoyl peroxide is not a mutagen.

There is no evidence to suggest that benzoyl peroxide is a carcinogen. However, there is some evidence from nonguidelines studies that benzoyl peroxide is a skin tumour promoter.

In the combined repeated dose and reproduction/developmental toxicity study [OECD TG 422], no treatment-related changes in pre-coital time, rate of copulation, fertility and gestation were noted in any treated group. Adverse effects were shown at the highest dose of 1,000 mg/kg bw/day in parental male rats with the reduction of reproductive organ weight and slight testes degeneration. In parental female rats, no adverse effects were observed during the test period. The NOAEL for reproduction toxicity in male rats was 500 mg/kg bw/day. In the offspring, the only effect seen was that body weight gain of pups at dose of 1,000 mg/kg bw/day was significantly decreased. The NOAEL for developmental toxicity was 500 mg/kg bw/day.

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.

CARCINOGEN

Styrene	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2B
Silica, crystalline (inhaled in the form of quartz or cristobalite from occupational sources)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Benzoyl peroxide	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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DIBENZOYL PEROXIDE:

STYRENE:

■ DO NOT discharge into sewer or waterways.

POWERS CHEM-STUD:

Marine Pollutant: Not Determined

STYRENE:

■ Hazardous Air Pollutant:

Yes

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Section 12 - ECOLOGICAL INFORMATION

■ Fish LC50 (96hr.) (mg/l):	25.1- 74.8
■ Algae IC50 (72hr.) (mg/l):	67- 200
■ log Kow (Prager 1995):	2.95
■ log Kow (Sangster 1997):	3.05
■ BOD5:	0.55- 1.95
■ ThOD:	3.07
■ Half- life Soil - High (hours):	672
■ Half- life Soil - Low (hours):	336
■ Half- life Air - High (hours):	7.3
■ Half- life Air - Low (hours):	0.9
■ Half- life Surface water - High (hours):	672
■ Half- life Surface water - Low (hours):	336
■ Half- life Ground water - High (hours):	5040
■ Half- life Ground water - Low (hours):	672
■ Aqueous biodegradation - Aerobic - High (hours):	672
■ Aqueous biodegradation - Aerobic - Low (hours):	336
■ Aqueous biodegradation - Anaerobic - High (hours):	2688
■ Aqueous biodegradation - Anaerobic - Low (hours):	1344
■ Aqueous biodegradation - Removal secondary treatment - High (hours):	99%
■ Aqueous biodegradation - Removal secondary treatment - Low (hours):	8%
■ Photooxidation half- life air - High (hours):	7.3
■ Photooxidation half- life air - Low (hours):	0.9

■ for styrene:

Transport: Styrene is expected to volatilise from surface waters as predicted by its Henry's Law constant. The chemical is also removed from waters by adsorption onto soils and sediments. Under certain conditions, styrene may leach through soil (particularly sandy soils) and enter ground water

Transformation/ Persistence:

Air: In the atmosphere, styrene reacts with both hydroxyl radicals and ozone with estimated half-lives of 3.5 and 9 hours, respectively. The chemical is also degraded in the presence of NOX and natural sunlight. Styrene contributes to the formation of photochemical smog due to indirect photochemical reactions. Smog chamber experiments with simulated sunlight and auto exhaust as a source of styrene, showed a 55% disappearance of styrene in 2 hours .

Soil: Biodegradation is the major route of removal of styrene from soils. Microbes isolated from landfill soil degraded 95% of the styrene present in 16 weeks

Water: Styrene rapidly volatilises from surface water with estimated half-lives from a river or pond of 0.6 days and 13 days, respectively. Microbes isolated from unadapted sewage sludge degraded 42% of the styrene present in 5 days while the microbial degradation with adapted sewage sludge was 80% in 5 days on the fish bioconcentration factor of 13.5 (goldfish) and the water solubility of styrene, the chemical is not likely to accumulate in biological organisms.

Ecotoxicity: Styrene is moderately toxic to aquatic organisms with toxicity values in the range of >1 mg/L to 100 mg/L. Styrene is expected to have low toxicity towards terrestrial animals

Fish LC50 (96 h): *Lepomis macrochirus* (blue gill) 25 mg/l; *Pimephales promelas* (fathead minnow) 46.4 mg/l (soft water); *Carassius auratus* (goldfish) 64.74 mg/l; *Lebistes reticulatus* (guppy) 74.83 mg/l

Daphnia magna LC50 (48 h): 23 mg/l; (24 h): 27 mg/l.

■ 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	Unsaturated substances (Reactive Emissions)	Major Stable Products produced following reaction with ozone.
Occupants (exhaled breath, ski oils, personal care products)	Isoprene, nitric oxide, squalene, unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products	Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, 6MHQ, geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid.
Soft woods, wood flooring,	Isoprene, limonene, alpha-	Formaldehyde, 4- AMC,

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Section 12 - ECOLOGICAL INFORMATION

including cypress, cedar and silver fir boards, houseplants	pinene, other terpenes and sesquiterpenes	pinoaldehyde, pinic acid, pinonic acid, formic acid, methacrolein, methyl vinyl ketone, SOAs including ultrafine particles
Carpets and carpet backing	4- Phenylcyclohexene, 4-vinylcyclohexene, styrene, 2-ethylhexyl acrylate, unsaturated fatty acids and esters	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, hexanal, glyoxal, N-methylformamide, nicotinaldehyde, cotinine
Soiled clothing, fabrics, bedding	Squalene, unsaturated sterols, oleic acid and other saturated fatty acids	Acetone, geranyl acetone, 6MHO, 4OPA, formaldehyde, nonanal, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid
Soiled particle filters	Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles	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
Ventilation ducts and duct liners	Unsaturated fatty acids and esters, unsaturated oils, neoprene	
" 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, pinoaldehyde, 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

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

log Kow: 2.95-3.05

Koc: 270-550

Half-life (hr) air: 3.5-9

Half-life (hr) H₂O surface water: 3

Henry's atm m³/mol: 2.81E-03

BOD 5 if unstated: 0.55-2.45,65%

COD: 2.80-2.88

ThOD: 3.07

BCF: 13.5

Toxicity Fish: LC50(96)0.87-0.95ppm

Nitrif. inhib.: 75% inhib at 175mg/L

DIBENZOYL PEROXIDE:

■ Half- life Soil - High (hours):	48
■ Half- life Soil - Low (hours):	4
■ Half- life Air - High (hours):	510
■ Half- life Air - Low (hours):	51
■ 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
■ Photolysis maximum light absorption - High (nano- m):	275
■ Photolysis maximum light absorption - Low (nano- m):	235
■ Photooxidation half- life air - High (hours):	510
■ Photooxidation half- life air - Low (hours):	51

■ For benzoyl peroxide:

Benzoyl peroxide has a melting point of 104 -106 °C, vapor pressure of 0.00929 Pa, solubility of 9.1 mg/L in water at 25 C, and log Pow of 3.43 at 25 C.

Environmental fate:

For indirect photolysis in the atmosphere, the half-life is estimated to be 3 days . The substance is readily biodegradable (OECD TG 301C: 83% by BOD after 21 days) and hydrolyses rapidly in water [OECD TG 111] with a half-life of 11.87 hrs at pH 4.0 and 5.20 hr at pH 7.0 at 25 C. The main hydrolysis product of benzoyl peroxide is benzoic acid .The estimated BCF of 92 suggests that the chemical has a low potential for bioaccumulation.

If the most realistic emission pattern to water is assumed then the substance will remain in the aquatic compartment.

Ecotoxicity:

Green algae (*Selenastrum capricornutum*) EbC50 (72 h): 0.07 mg/L (biomass) and 0.44 mg/L (growth rate).

Daphnia magna:EC50 (48 h): 0.07 mg/L.

Fish LC50 (96 h): *Oryzias latipes* 0.24 mg/L.

Microorganism (activated sludge):EC50 (30 min): 35 mg/L

The toxicity observed is assumed to be due to benzoyl peroxide rather than benzoic acid, which shows much lower toxicity to aquatic organisms. One can assume that effects occur before hydrolysis takes place.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
styrene	LOW	LOW	LOW	MED
dibenzoyl peroxide	LOW	HIGH	LOW	MED

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Section 13 - DISPOSAL CONSIDERATIONS

Consult State Land Waste Management Authority for disposal.
Incinerate residue at an approved site or bury spilled dried material in an authorised landfill.
Bury damaged containers at an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: FLAMMABLE LIQUID

HAZCHEM:

●3Y (ADG7)

ADG7:

Class or division:	3	Subsidiary risk:	None
UN No.:	1866	UN packing group:	III
Special provisions:	223	Packing Instructions:	None
Notes:	None	Limited quantities:	5 L
Portable tanks and bulk containers - Instructions:	T2	Portable tanks and bulk containers - Special provisions:	TP1
Packagings and IBCs - Packing instruction:	P001, IBC03, LP01	Packagings and IBCs - Special packing provisions:	PP1

Shipping Name: RESIN SOLUTION flammable

Land Transport UNDG:

Class or division:	3	Subsidiary risk:	None
UN No.:	1866	UN packing group:	III

Shipping Name: RESIN SOLUTION flammable

Air Transport IATA:

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	None
UN/ID Number:	1866	Packing Group:	III
Special provisions:	A3		

Shipping Name: RESIN SOLUTION

Maritime Transport IMDG:

IMDG Class:	3	IMDG Subrisk:	None
UN Number:	1866	Packing Group:	III
EMS Number:	F- E, S- E	Special provisions:	223 944 955
Limited Quantities:	5 L	Marine Pollutant:	Not Determined

Shipping Name: RESIN SOLUTION flammable

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Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE

S5

REGULATIONS

Regulations for ingredients

styrene (CAS: 100-42-5) 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 - Domestic water quality", "Australia Dangerous Goods Code (ADG Code) - Goods Too Dangerous To Be Transported", "Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix F (Part 3)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5", "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", "International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0", "OECD Representative List of High Production Volume (HPV) Chemicals", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

graded sand (CAS: 14808-60-7) is found on the following regulatory lists;

"Australia - New South Wales Hazardous Substances Prohibited for Specific Uses", "Australia - New South Wales Hazardous Substances Requiring Health Surveillance", "Australia - South Australia Hazardous Substances Requiring Health Surveillance", "Australia - Tasmania Hazardous Substances Prohibited for Specified Uses", "Australia - Tasmania Hazardous Substances Requiring Health Surveillance", "Australia - Western Australia Hazardous Substances Requiring Health Surveillance", "Australia Hazardous Substances", "Australia Hazardous Substances Requiring Health Surveillance", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia Occupational Health and Safety (Commonwealth Employment) (National Standards) Regulations 1994 - Hazardous Substances Requiring Health Surveillance", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "OECD Representative List of High Production Volume (HPV) Chemicals"

dibenzoyl peroxide (CAS: 94-36-0) is found on the following regulatory lists;

"Australia Dangerous Goods Code (ADG Code) - List of Currently Assigned Organic Peroxides in Packagings", "Australia Exposure Standards", "Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix F (Part 3)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 2", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 4", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5", "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"

No data for Powers Chem-Stud (CW: 63999)

Section 16 - OTHER INFORMATION

REPRODUCTIVE HEALTH GUIDELINES

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
styrene	85 mg/m ³	NAD	0.3	-	

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

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

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

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

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive

American Industrial Hygiene Association Journal 57: 641-649 (1996).

■ 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.

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Section 16 - OTHER INFORMATION

■ 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.